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Service Manual

Contents **Page**

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:

Notes:

- Figures can deviate due to the different set executions.
- Specifications are indicative (subject to change).

1.1 Technical Specifications

1.1.1 Vision

Display type	:	LCD
Screen size	:	32" (82 cm), 16:9
	:	42" (107 cm), 16:9
	:	47" (120 cm), 16:9
	:	52" (132 cm), 16:9
Resolution (H × V pixels)	:	1366×768 (32")
	:	1366×768(42PFL34x)
	:	1920×1080 (rest)
Dyn. contrast ratio	:	26000:1 (32" and 42PFL34x)
	:	29000:1 (rest 42" & 47")
	:	33000:1 (52")
Min. light output (cd/m^2)	:	500
Typ. response time (ms)	:	2 ~ 8 (depending on model number)
Viewing angle (H × V degrees)	:	178 × 178 (rest)
	:	160 × 160 (52")
Tuning system	:	PLL
Presets/channels	:	100 presets
Tuner bands	:	VHF, UHF, S, H
TV Color systems	:	ATSC
	:	NTSC
Video playback	:	NTSC
Cable	:	Unscrambled digital cable - QAM
Supported computer formats (60Hz)	:	640 × 480
	:	800 × 600
	:	1024 × 768
	:	1280 × 1024
	:	1280 × 768
	:	1360 × 768
	:	1920 × 1080i
	:	1920 × 1080p (only for full HD sets)
Supported video formats (60Hz)	:	480i
	:	480p
	:	720p
	:	1080i
	:	1080p (only for full HD sets)

1.1.2 Sound

Sound systems	:	Stereo
	:	BBE®
	:	Dolby Digital®
Maximum power (W_{RMS})	:	20 ~ 30 (depending on model number)

1.1.3 Miscellaneous

Power supply:		
- Mains voltage (V_{AC})	:	90 - 240
- Mains frequency (Hz)	:	50 / 60
Ambient conditions:		
- Temperature range (°C)	:	+5 to +40
- Maximum humidity	:	90% R.H.
Power consumption (values are indicative)		
- Normal operation (W)	:	≈ 240
- Stand-by (W)	:	< 1
Dimensions (W × H × D inch)		
- 32"	:	32.3 × 20.4 × 3.6
- 42"	:	40.7 × 26.2 × 3.5
- 47"	:	44.8 × 28.5 × 4.0
- 52"	:	51.2 × 31.4 × 4.7
Weight without stand (lb.)		
- 32"	:	31.9
- 42"	:	45.1
- 47"	:	60.5
- 52"	:	83.8

1.2 Connection Overview

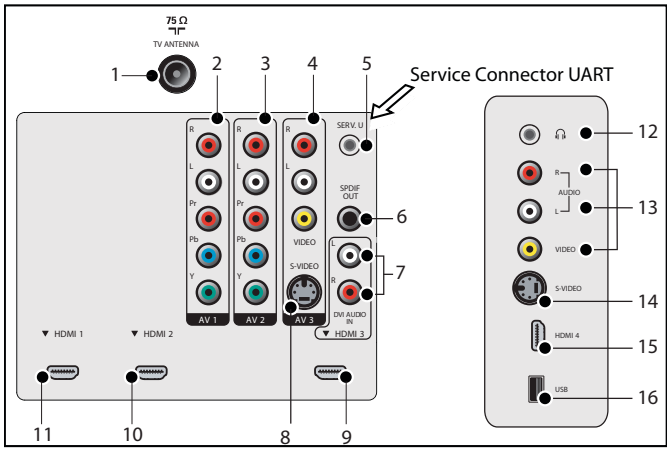

Figure 1-1 Side and rear I/O connections

Note: The following connector color abbreviations are used (acc. to DIN/IEC 757): Bk= Black, Bu= Blue, Gn= Green, Gy= Grey, Rd= Red, Wh= White, and Ye= Yellow.

1.2.1 Side Connections

Head phone - Out (12)

Bk	- Head phone	32 - 600 ohm / 10 mW	

Cinch: Video CVBS - In, Audio - In (13)

Ye	- Video CVBS	1 V_{PP} / 75 ohm	
Wh	- Audio L	0.5 V_{RMS} / 10 kohm	
Rd	- Audio R	0.5 V_{RMS} / 10 kohm	

S-Video (Hosiden): Video Y/C - In (14)

1	- Ground Y	Gnd	
2	- Ground C	Gnd	
3	- Video Y	1 V_{PP} / 75 ohm	
4	- Video C	0.3 V_{PP} / 75 ohm	

HDMI4: Digital Video, Digital Audio - In (15)

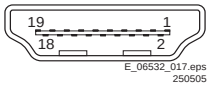

Figure 1-2 HDMI (type A) connector

1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	
4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- n.c.		
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

USB2.0 (16)

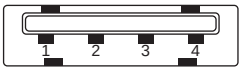

Figure 1-3 USB (type A)

1	- +5V		
2	- Data (-)		
3	- Data (+)		
4	- Ground	Gnd	

1.2.2 Rear Connections

HDMI1, 2 & 3: Digital Video, Digital Audio - In (9, 10, 11)

1	- D2+	Data channel	
2	- Shield	Gnd	
3	- D2-	Data channel	
4	- D1+	Data channel	
5	- Shield	Gnd	
6	- D1-	Data channel	
7	- D0+	Data channel	
8	- Shield	Gnd	
9	- D0-	Data channel	
10	- CLK+	Data channel	
11	- Shield	Gnd	
12	- CLK-	Data channel	
13	- n.c.		
14	- n.c.		
15	- DDC_SCL	DDC clock	
16	- DDC_SDA	DDC data	
17	- Ground	Gnd	
18	- +5V		
19	- HPD	Hot Plug Detect	
20	- Ground	Gnd	

HDMI3: Cinch: DVI Audio - In (7)

Rd	- Audio - R	0.5 V_{RMS} / 10 kohm	
Wh	- Audio - L	0.5 V_{RMS} / 10 kohm	

Aerial - In (1)

-	- F-type (US)	Coax, 75 ohm	

AV1 & 2: Cinch: Video YPbPr - In, Audio - In (2, 3)

Gn	- Video Y	1 V_{PP} / 75 ohm	
Bu	- Video Pb	0.7 V_{PP} / 75 ohm	
Rd	- Video Pr	0.7 V_{PP} / 75 ohm	
Wh	- Audio L	0.5 V_{RMS} / 10 kohm	
Rd	- Audio R	0.5 V_{RMS} / 10 kohm	

AV3: Cinch: Video CVBS - In, Audio - In (4)

Ye	- Video CVBS	1 V_{PP} / 75 ohm	
Wh	- Audio L	0.5 V_{RMS} / 10 kohm	
Rd	- Audio R	0.5 V_{RMS} / 10 kohm	

AV3: S-Video (Hosiden): Video Y/C - In (8)

1	- Ground Y	Gnd	
2	- Ground C	Gnd	
3	- Video Y	1 V_{PP} / 75 ohm	
4	- Video C	0.3 V_{PP}P / 75 ohm	

Service Connector UART (5)

1	- UART_TX	Transmit	
2	- Ground	Gnd	
3	- UART_RX	Receive	

Cinch: S/PDIF - Out (6)

Bk	- Coaxial	0.4 - 0.6V_{PP} / 75 ohm	

1.3 Chassis Overview

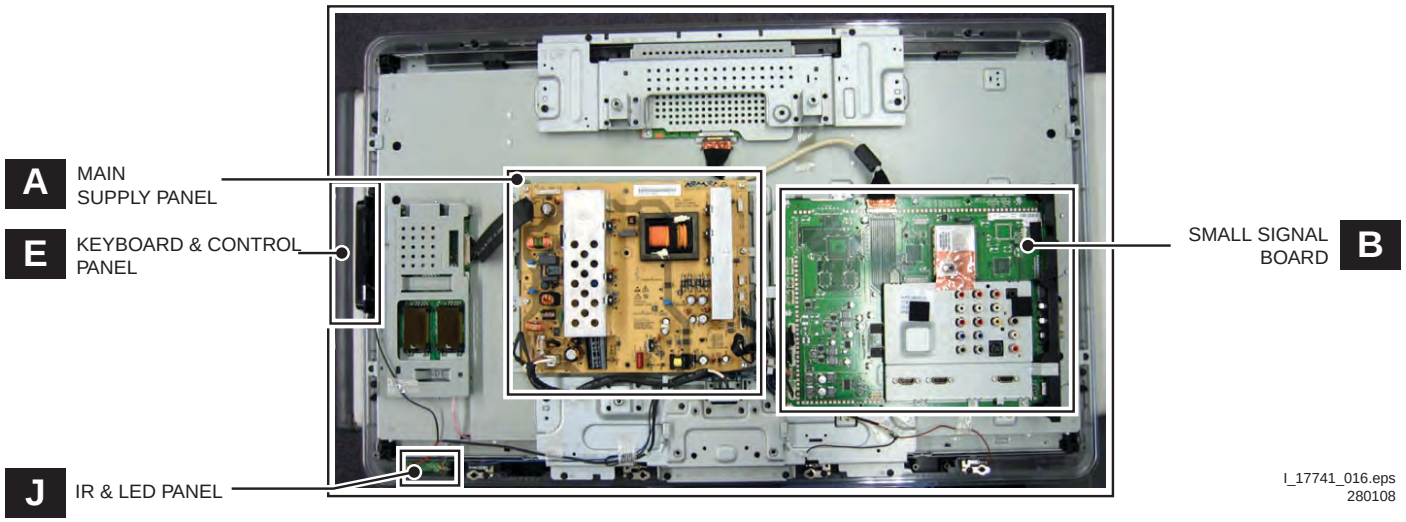

Figure 1-4 PWB/CBA locations 32" models

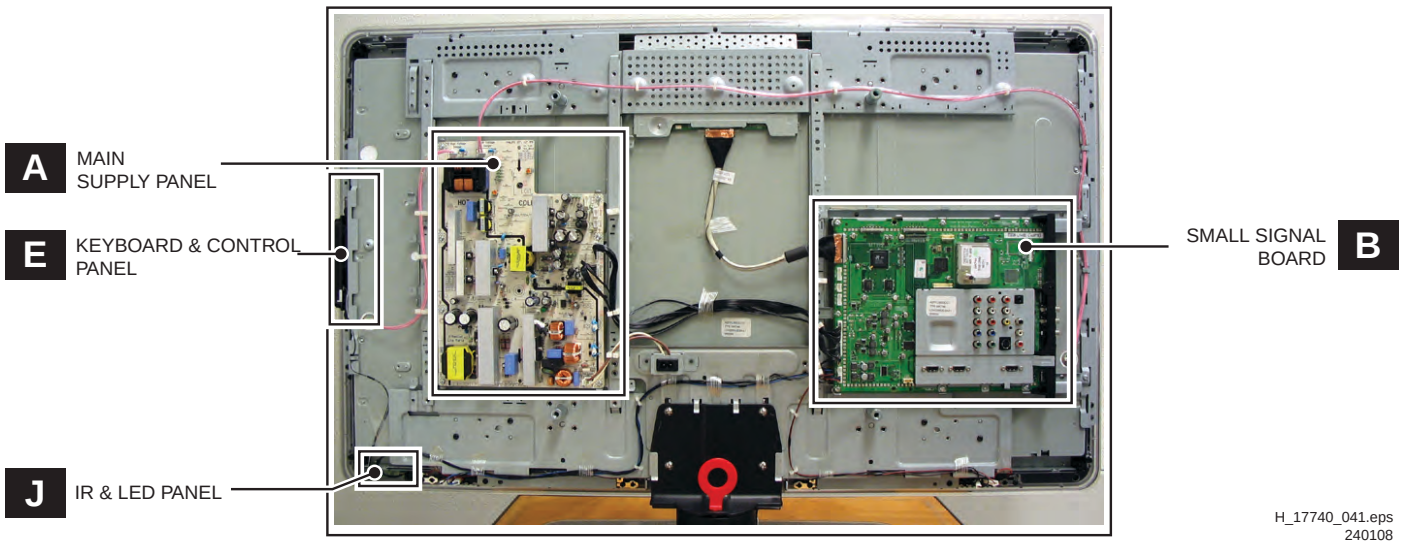

Figure 1-5 PWB/CBA locations 42" models

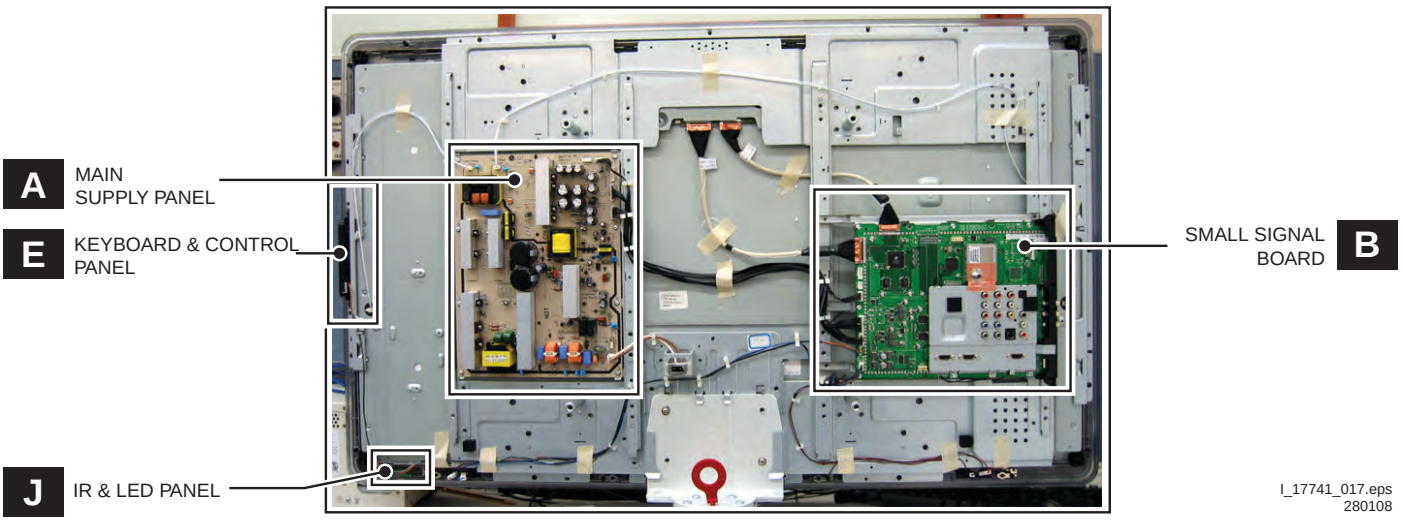

Figure 1-6 PWB/CBA locations 47" models

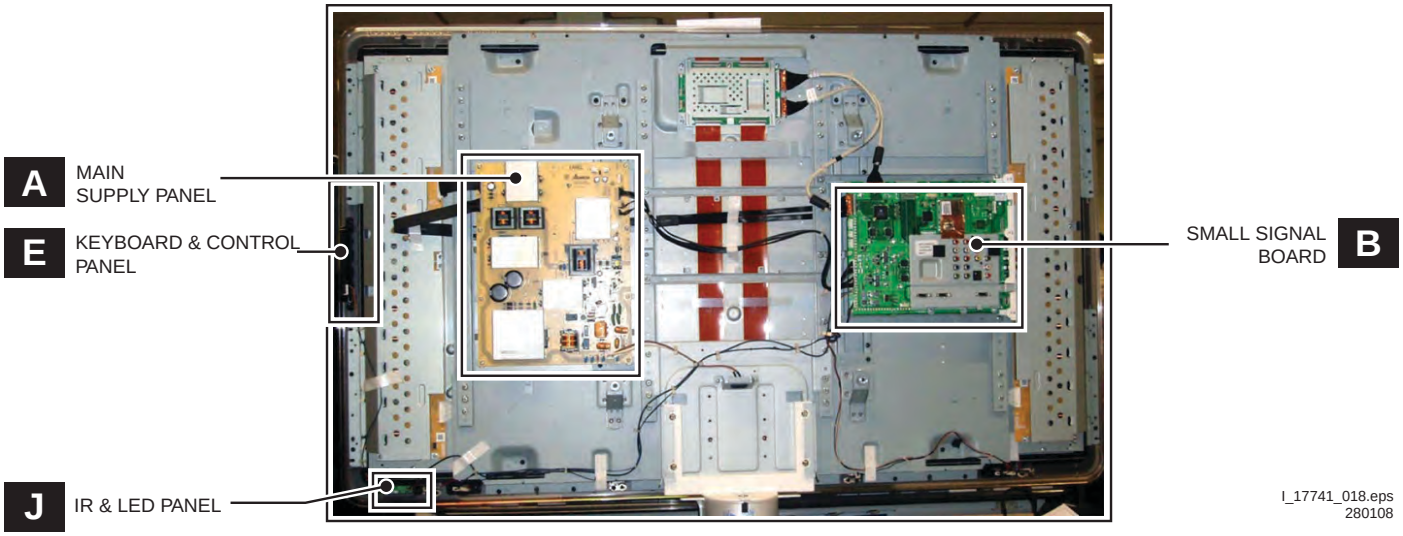

Figure 1-7 PWB/CBA locations 52" models

2. Safety Instructions, Warnings, and Notes

Index of this chapter:

2.1 Safety Instructions

Safety regulations require the following **during** a repair:

- Connect the set to the Mains/AC Power via an isolation transformer (> 800 VA).
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that **after** a repair, the set must be returned in its original condition. Pay in particular attention to the following points:

- Route the wire trees correctly and fix them with the mounted cable clamps.
- Check the insulation of the Mains/AC Power lead for external damage.
- Check the strain relief of the Mains/AC Power cord for proper function.
- Check the electrical DC resistance between the Mains/AC Power plug and the secondary side (only for sets that have a Mains/AC Power isolated power supply):
  1. Unplug the Mains/AC Power cord and connect a wire between the two pins of the Mains/AC Power plug.
  2. Set the Mains/AC Power switch to the “on” position (keep the Mains/AC Power cord unplugged!).
  3. Measure the resistance value between the pins of the Mains/AC Power plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch “off” the set, and remove the wire between the two pins of the Mains/AC Power plug.
- Check the cabinet for defects, to prevent touching of any inner parts by the customer.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this same potential.
- Be careful during measurements in the high voltage section.
- Never replace modules or other components while the unit is switched “on”.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.3 Notes

2.3.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground (⏚), or hot ground (⏚), depending on the tested area of circuitry. The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a color bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz for PAL, or 61.25 MHz for NTSC (channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊼) aerial signal. Measure the voltages in the power supply section both in normal operation (⏻) and in stand-by (⏻). These values are indicated by means of the appropriate symbols.
- Manufactured under license from Dolby Laboratories. “Dolby”, “Pro Logic” and the “double-D symbol”, are trademarks of Dolby Laboratories.

2.3.2 Schematic Notes

- All resistor values are in ohms, and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an “E” or an “R” (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are given in micro-farads ($\mu = \times 10^{-6}$), nano-farads ($n = \times 10^{-9}$), or pico-farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An “asterisk” (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Spare Parts List. Therefore, always check this list when there is any doubt.

2.3.3 BGA (Ball Grid Array) ICs

BGA Temperature Profiles

For BGA-ICs, you **must** use the correct temperature-profile, which is coupled to the 12NC. For an overview of these profiles, contact your local Service organization.

2.3.4 Lead-free Soldering

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free soldering tin Philips SAC305 with order code 0622 149 00106. If lead-free solder paste is required, please contact the manufacturer of your soldering equipment. In general, use of solder paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free soldering tin. The solder tool must be able:
  - To reach a solder-tip temperature of at least 400°C.
  - To stabilize the adjusted temperature at the solder-tip.
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature of around 360°C - 380°C is reached and stabilized at the solder joint. Heating time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C, otherwise wear-out of tips will increase drastically and flux-fluid will be destroyed. To avoid wear-out of tips, switch “off” unused equipment or reduce heat.
- Mix of lead-free soldering tin/parts with leaded soldering tin/parts is possible but PHILIPS recommends strongly **to avoid** mixed regimes. If this cannot be avoided, carefully clear the solder-joint from old tin and re-solder with new tin.

2.3.5 Alternative BOM identification

The **third digit** in the serial number (example: AG**2**B0335000001) indicates the number of the alternative B.O.M. (Bill Of Materials) that has been used for producing the specific TV set. In general, it is possible that the same TV model on the market is produced with e.g. two different types of displays, coming from two different suppliers. This will then result in sets which have the same CTN (Commercial Type Number; e.g. 28PW9515/12) but which have a different B.O.M. number.
By looking at the third digit of the serial number, one can identify which B.O.M. is used for the TV set he is working with. If the third digit of the serial number contains the number “1” (example: AG**1**B033500001), then the TV set has been manufactured according to B.O.M. number 1. If the third digit is a “2” (example: AG**2**B0335000001), then the set has been produced according to B.O.M. no. 2. ***This is important for ordering the correct spare parts!***
For the third digit, the numbers 1...9 and the characters A...Z can be used, so in total: 9 plus 26= 35 different B.O.M.s can be indicated by the third digit of the serial number.

Identification: The bottom line of a type plate gives a 14-digit serial number. Digits 1 and 2 refer to the production center (e.g. AG is Bruges), digit 3 refers to the B.O.M. code, digit 4 refers to the Service version change code, digits 5 and 6 refer to the production year, and digits 7 and 8 refer to production week (in example below it is 2006 week 17). The 6 last digits contain the serial number.

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Figure 2-1 Serial number (example)

2.3.6 Board Level Repair (BLR) or Component Level Repair (CLR)

If a board is defective, consult your repair procedure to decide if the board has to be exchanged or if it should be repaired on component level.
If your repair procedure says the board should be exchanged completely, do not solder on the defective board. Otherwise, it cannot be returned to the O.E.M. supplier for back charging!

2.3.7 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages**. While some may not be dangerous in themselves, they can cause unexpected reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.

3. Directions for Use

You can download this information from the following websites:
http://www.philips.com/support
http://www.p4c.philips.com

4. Mechanical Instructions

Index of this chapter:

Notes:

- Figures below can deviate slightly from the actual situation, due to the different set executions.
- Follow the disassemble instructions in described order.
- Please pay special attention to the speaker wires when re-assembling the set. Place the cable tapes as shown in next figures.

4.1 Cable Dressing

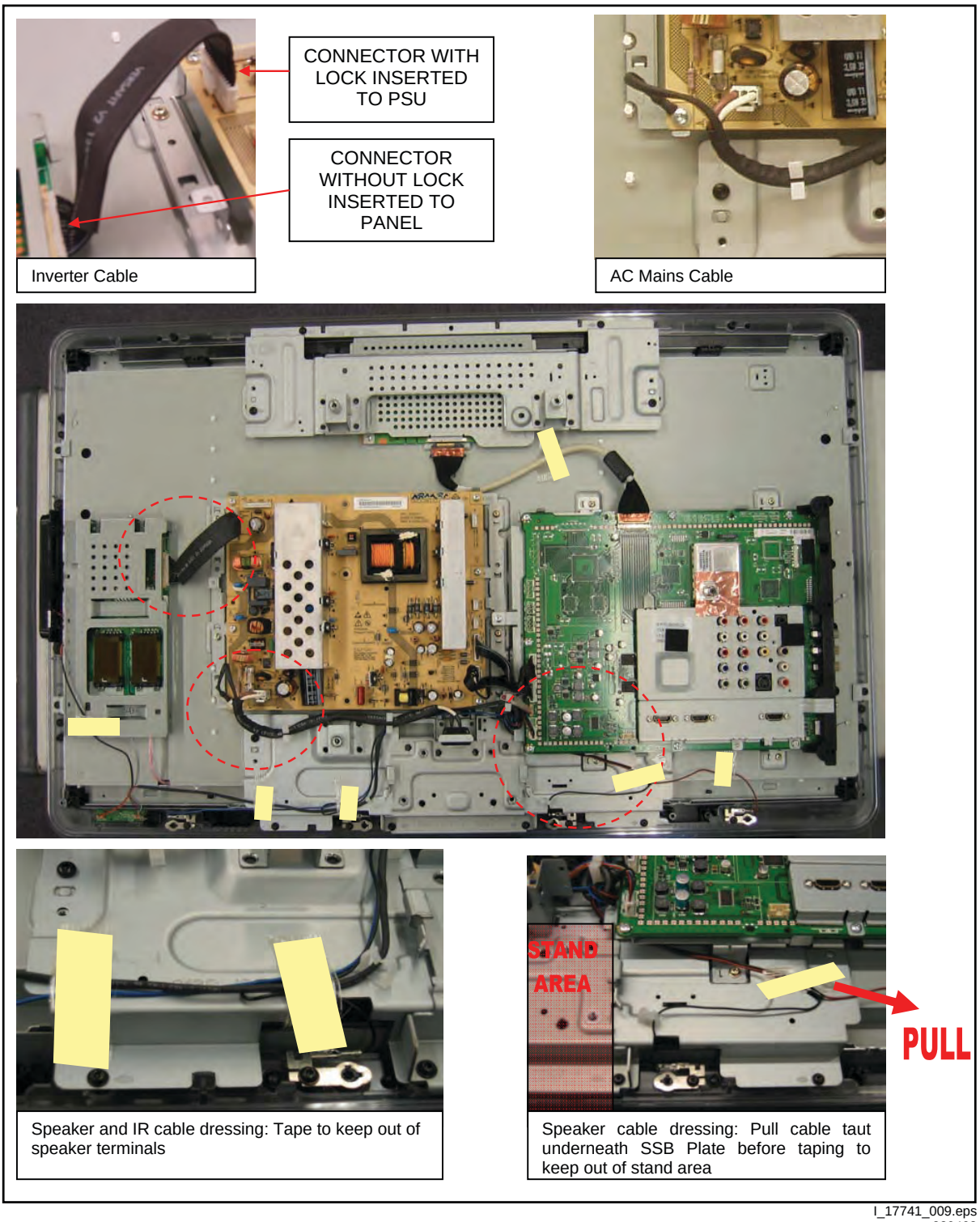

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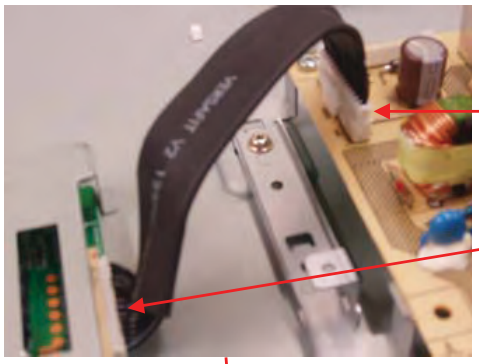
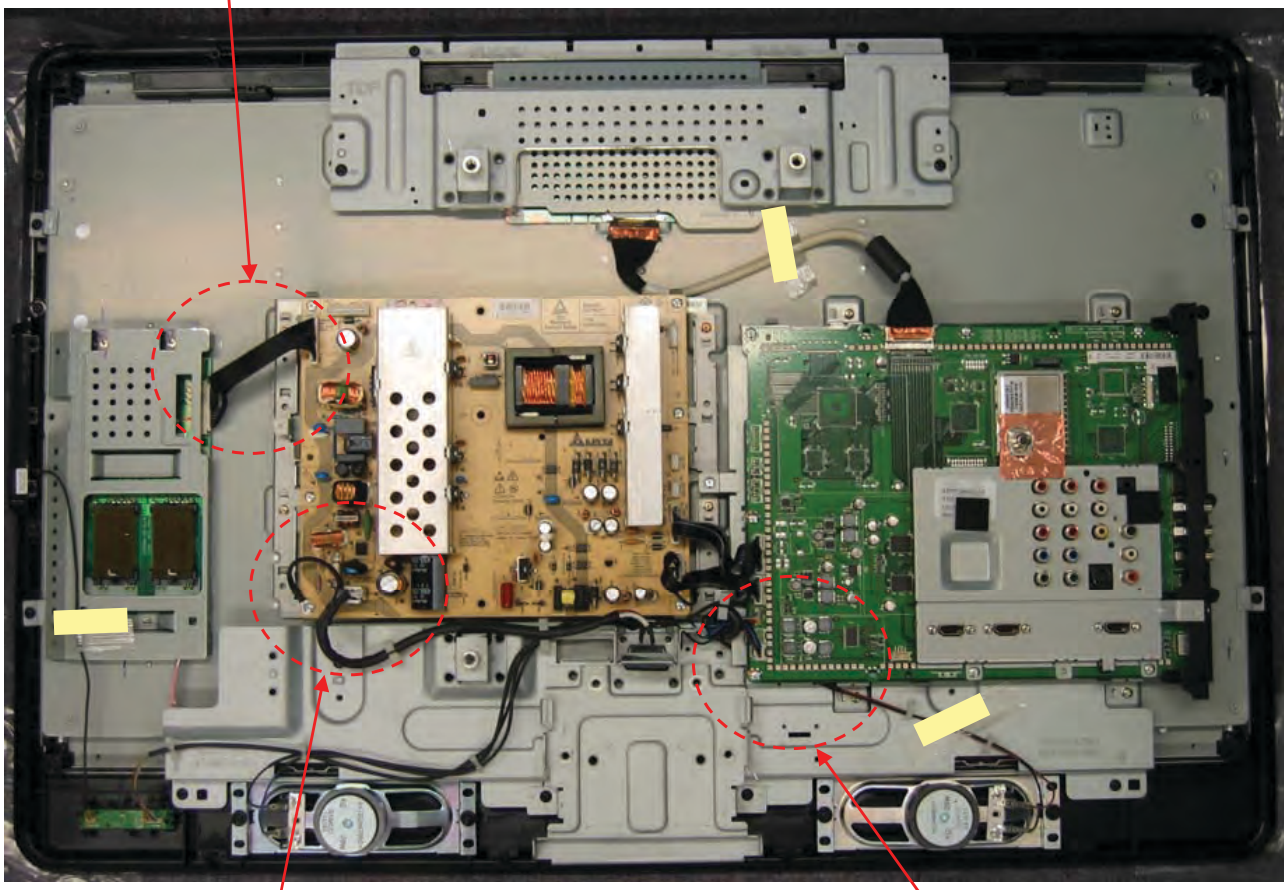
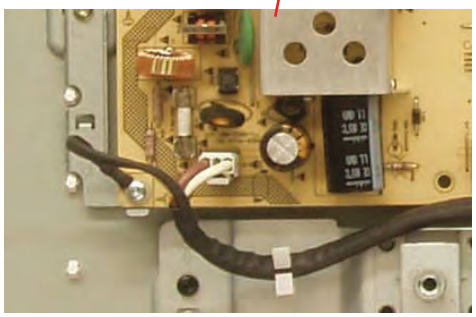
Figure 4-1 Cable dressing (32" models, ME8 styling)



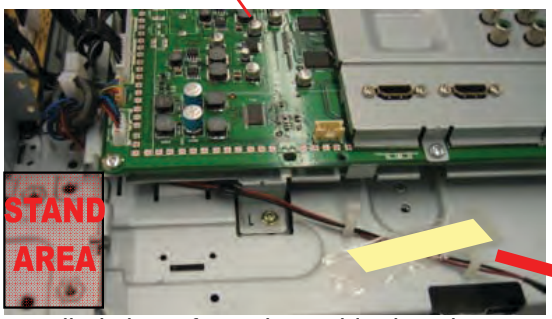
CONNECTOR WITH LOCK INSERTED TO PSU

CONNECTOR WITHOUT LOCK INSERTED TO PANEL





AC Mains Shield wire to be grounded to bottom corner of PSU with screw



Detailed view of speaker cable dressing: Pull cable taut underneath SSB Plate before

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Figure 4-2 Cable dressing (32" models, MG8 styling)

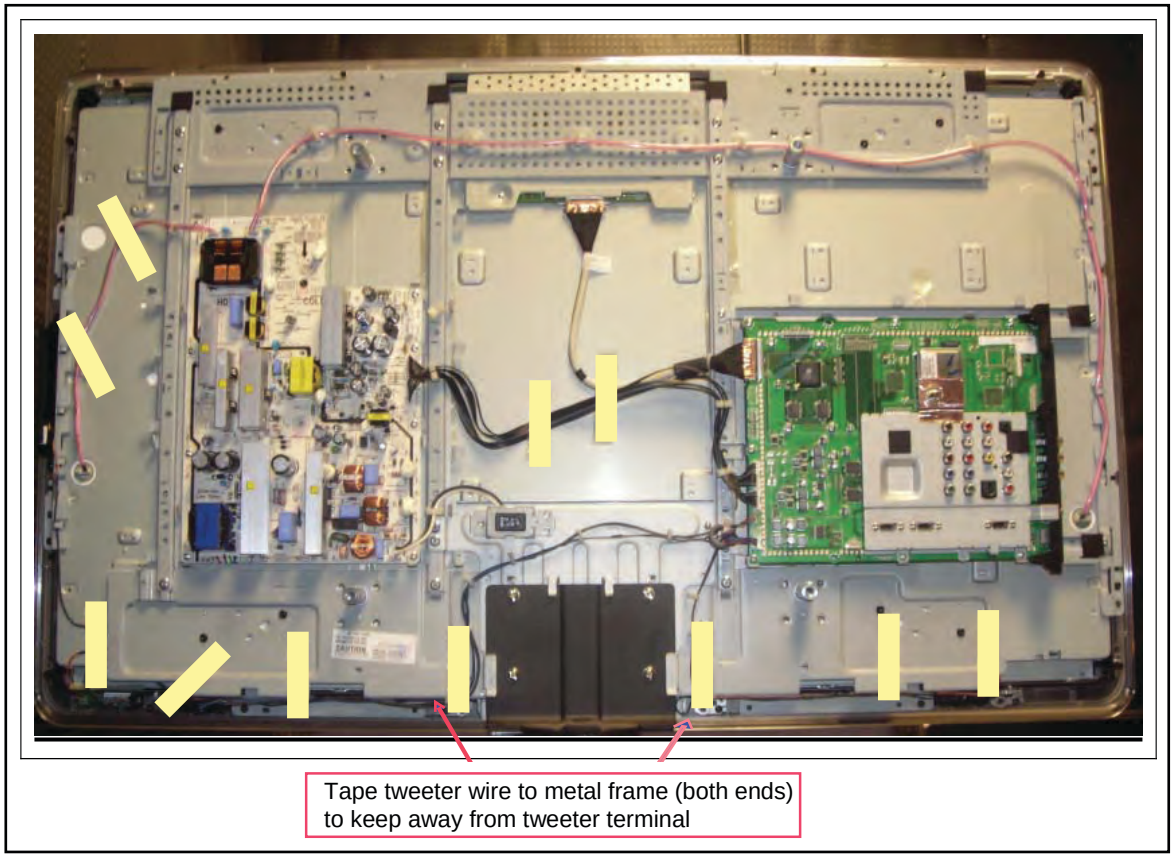

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Figure 4-3 Cable dressing (42" models, ME8 styling)

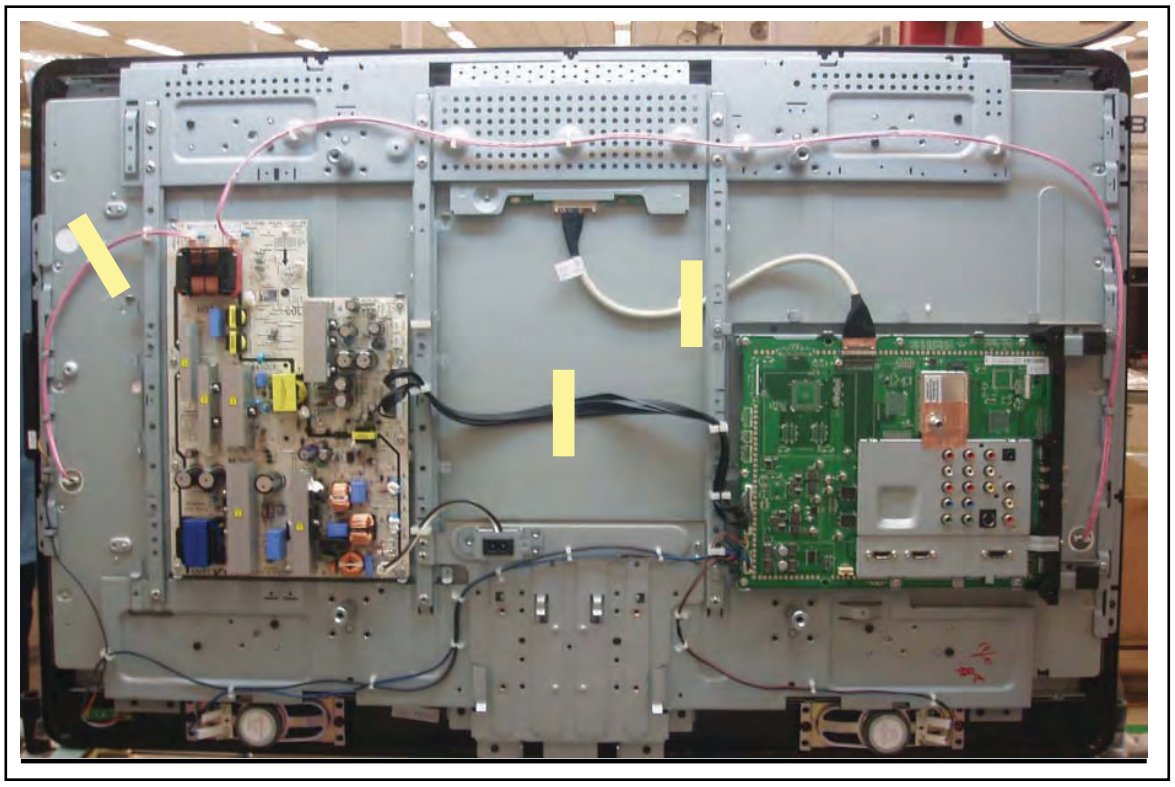

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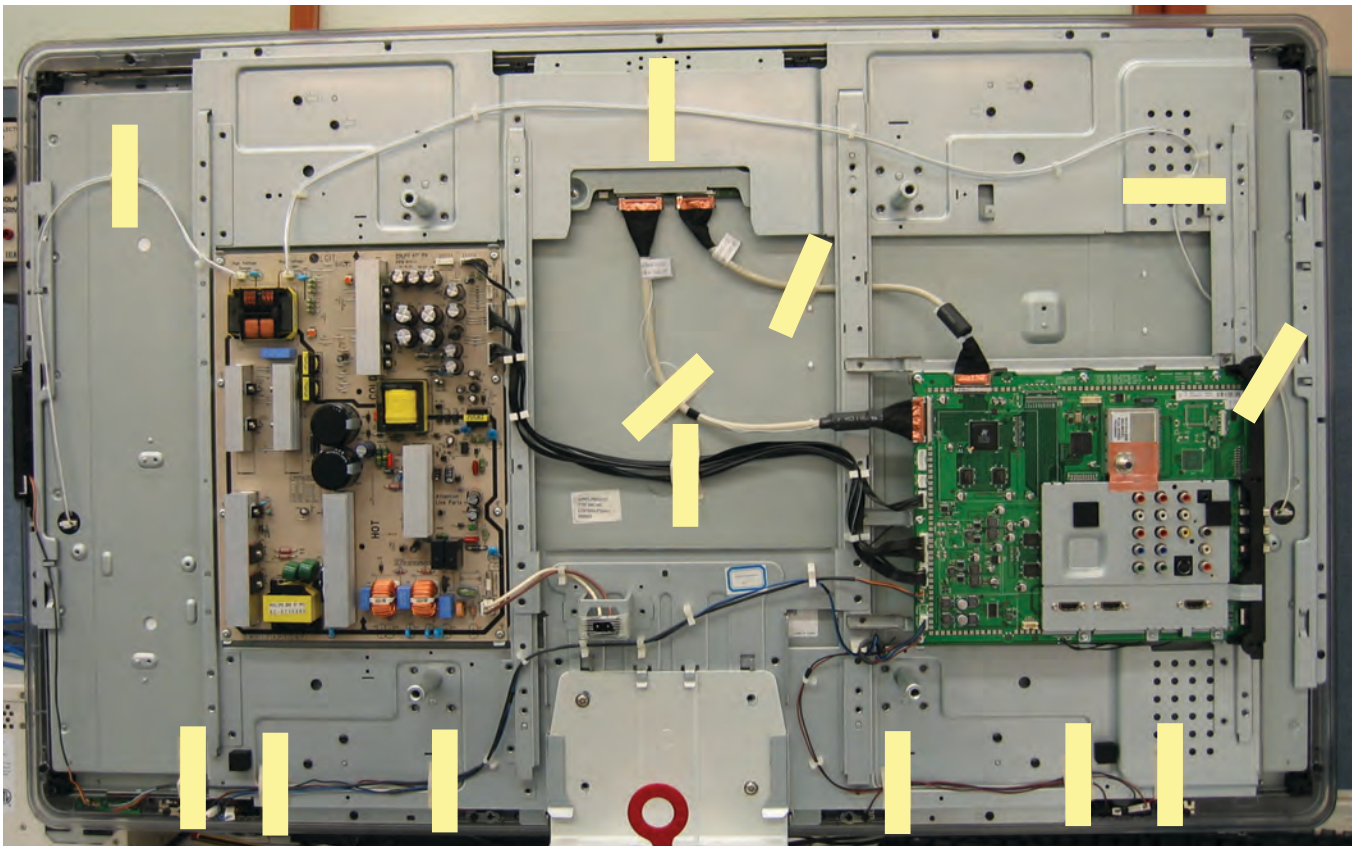
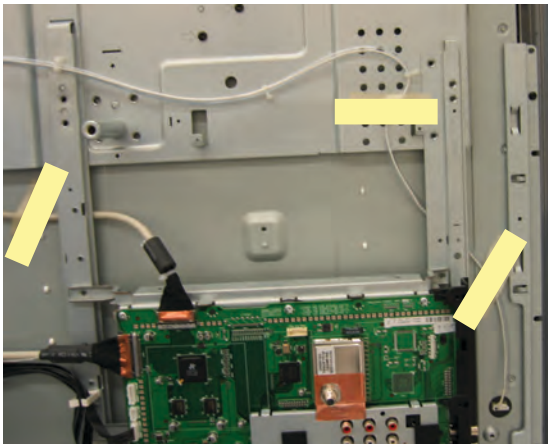
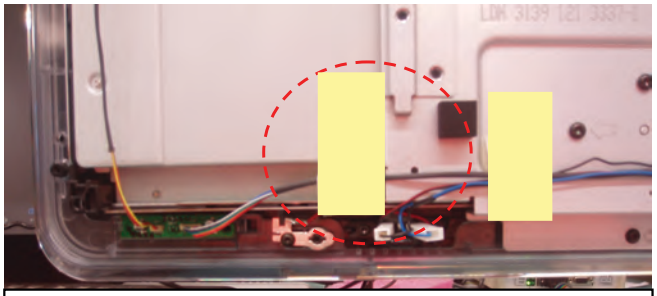
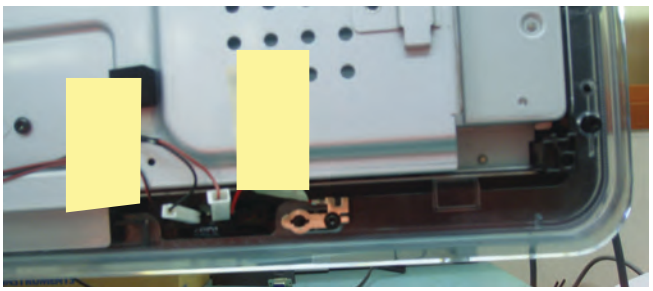
Figure 4-4 Cable dressing (42" models, MG8 styling)









Tape the 8C02 cable (IR Board to SSB) and the short red tweeter wire together.

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Figure 4-5 Cable dressing (47" models, ME8 styling)

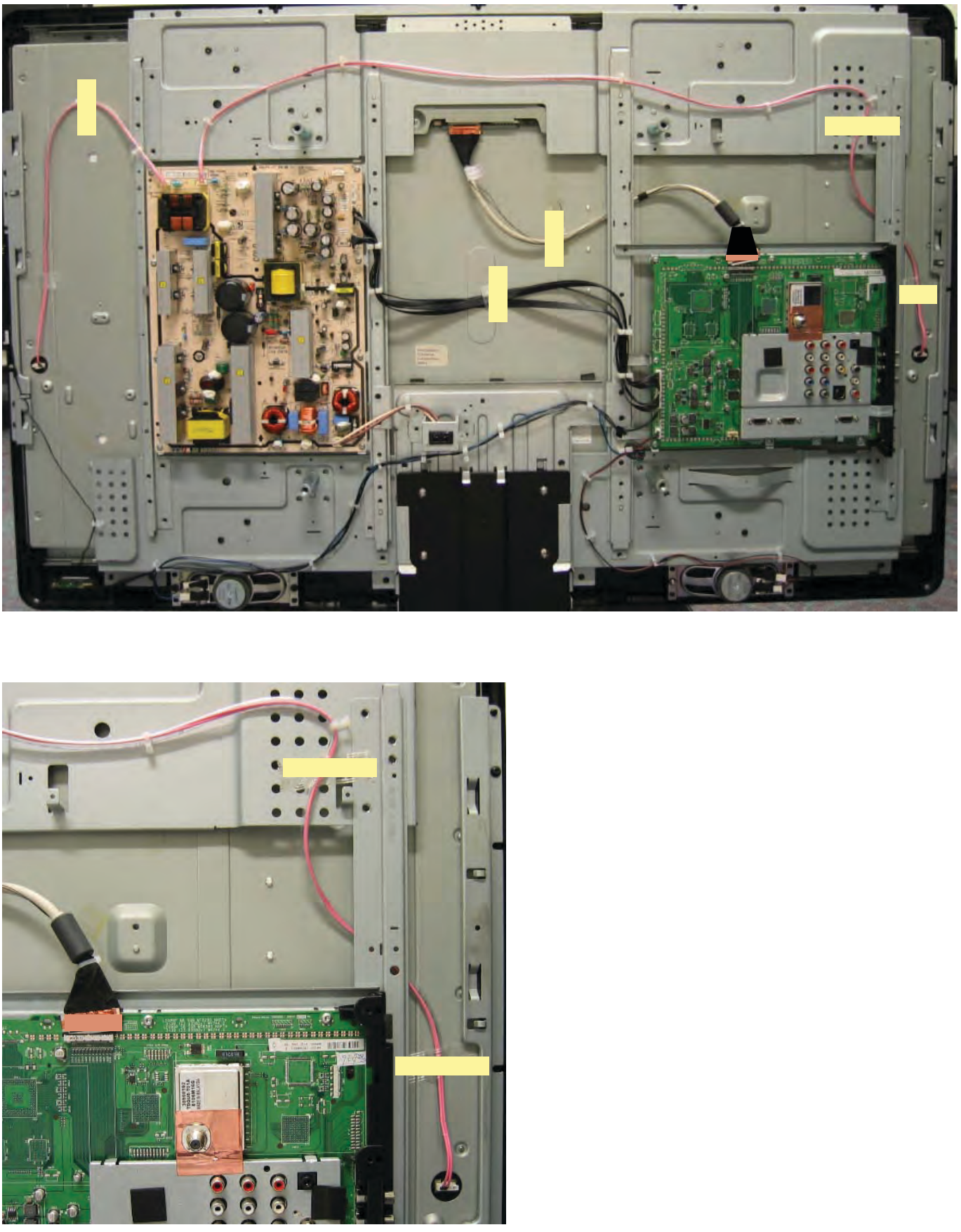

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Figure 4-6 Cable dressing (47" models, MG8 styling)

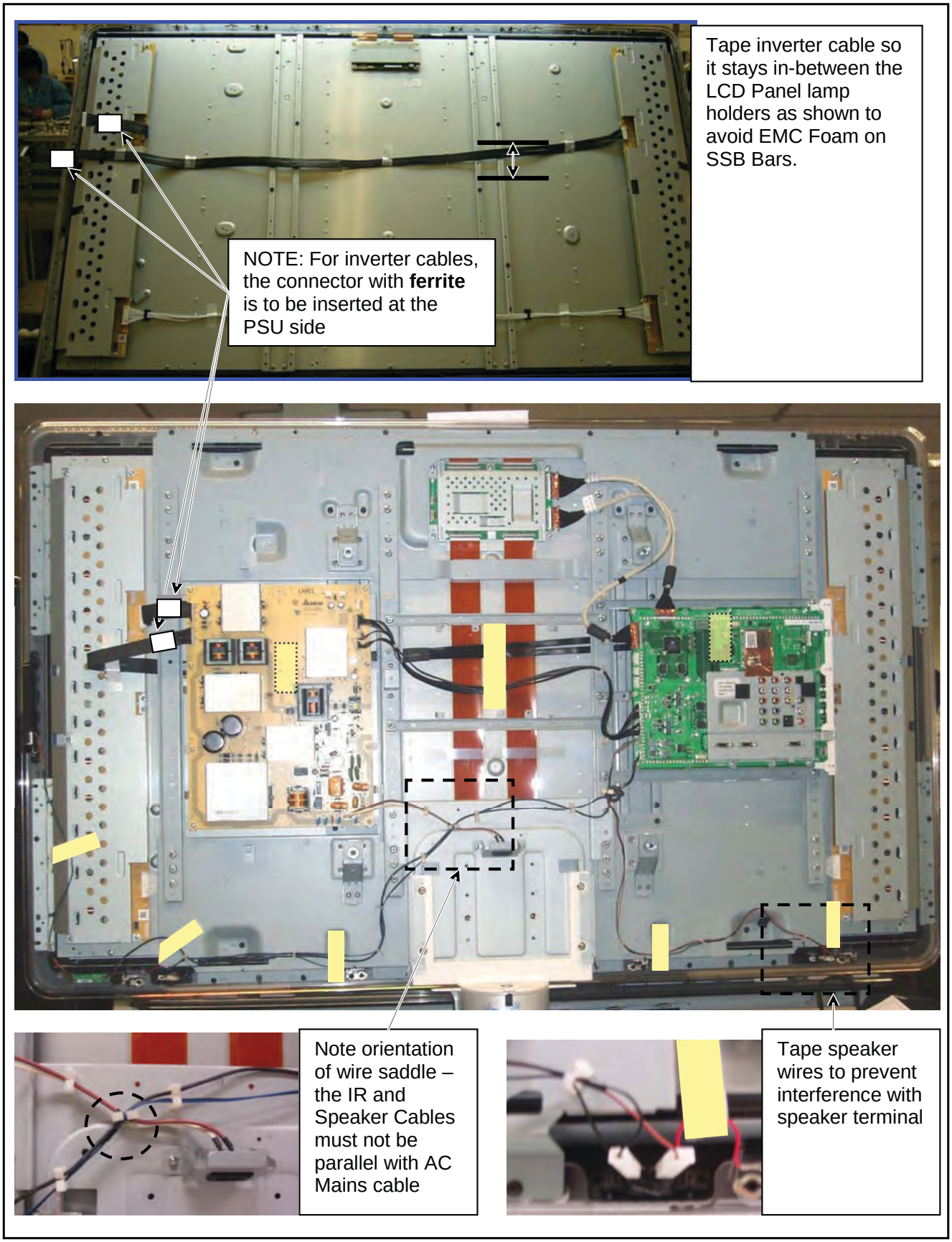

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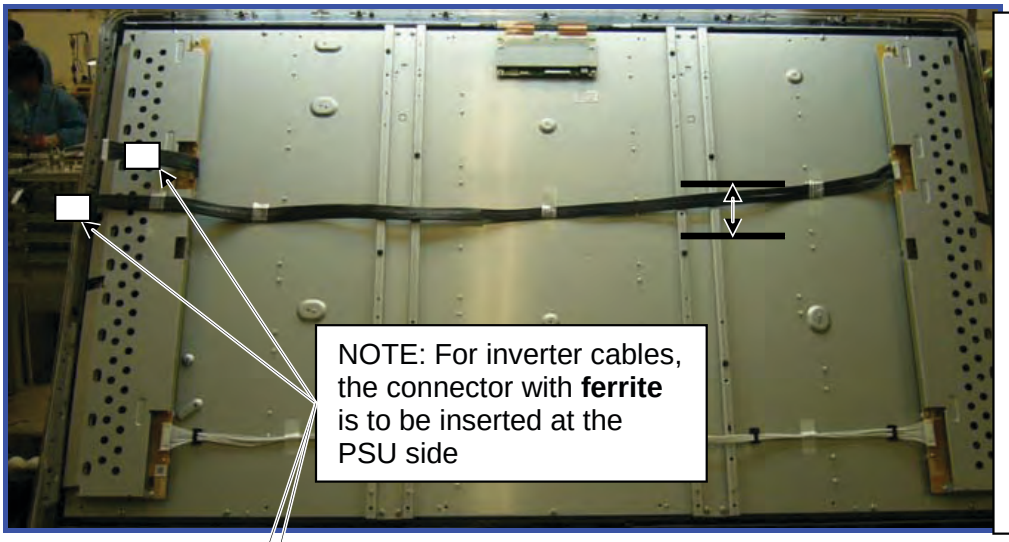
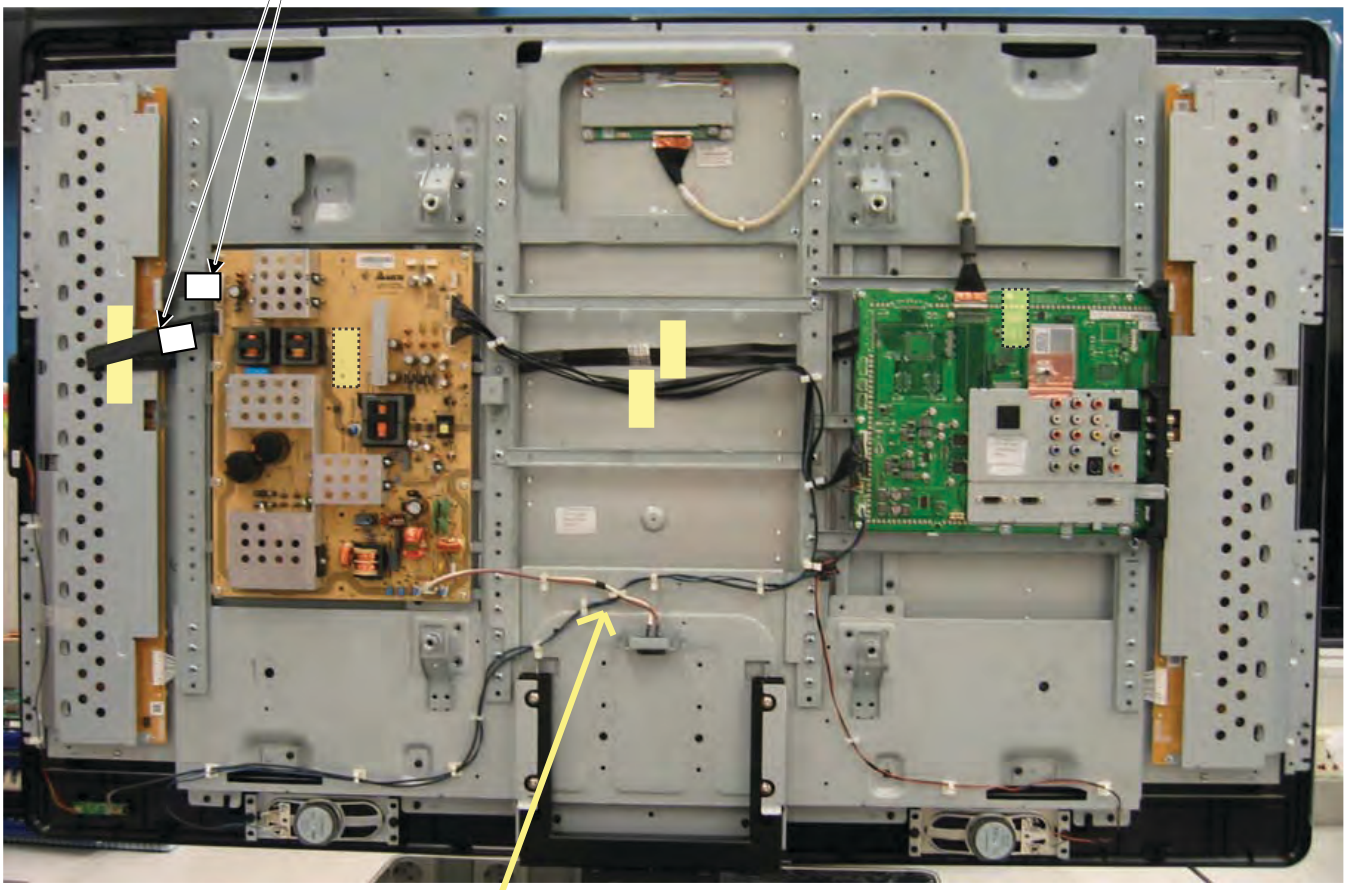
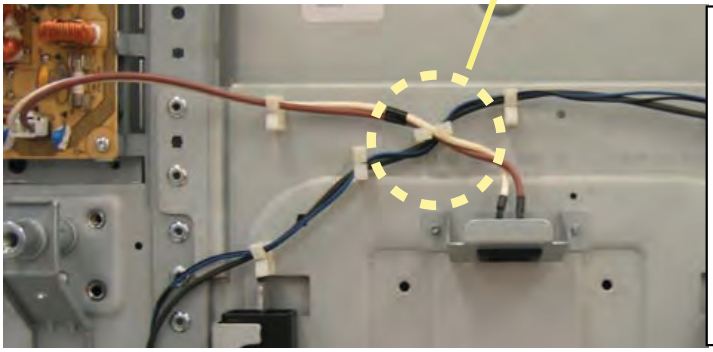
Figure 4-7 Cable dressing (52" models, ME8 styling)



Tape inverter cable so it stays in-between the LCD Panel lamp holders as shown to avoid EMC Foam on SSB Bars.

NOTE: For inverter cables, the connector with **ferrite** is to be inserted at the PSU side





Note horizontal orientation of wire saddle – the IR and Speaker Cables must cross the AC Mains Cable with “X” shape and not lay in parallel

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Figure 4-8 Cable dressing (52" models, MG8 styling)

4.2 Service Positions

For easy servicing of this set, there are a few possibilities created:

- The buffers from the packaging.
- Foam bars (created for Service).

4.2.1 Foam Bars

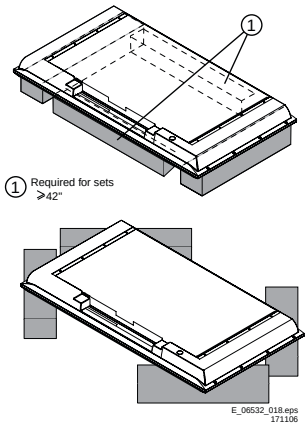

Figure 4-9 Foam bars

The foam bars (order code 3122 785 90580 for two pieces) can be used for all types and sizes of Flat TVs. See figure “Foam bars” for details.
Sets with a display of 42" and larger, require **four** foam bars [1].
Ensure that the foam bars are always supporting the cabinet and **never** only the display.
Caution: Failure to follow these guidelines can seriously damage the display!
By laying the TV face down on the (ESD protective) foam bars, a stable situation is created to perform measurements and alignments. By placing a mirror under the TV, you can monitor the screen.

4.2.2 Service Stands

The MkII aluminium Service Stands are **not** suitable for this chassis. Use the stands that come with the set instead.

4.3 Assy/Panel Removal ME8 Styling

4.3.1 Back Cover

Warning: Disconnect the mains power cord before you remove the back cover.
Note: it is **not** necessary to remove the stand while removing the back cover.

Warning: Most sets have an additional hatch located in the back cover. These are meant for disconnecting the flat cables to the AmbiLight units in the back cover, **before** the back cover is lifted from the set. The hatches are not always located at the same place for all sets, therefore the figures below are only meant as indication.
It is mandatory to locate these hatches first, open them, and unplug connectors behind. Lifting the back cover without having done so, could result in damaging the connectors inside!

Refer to next figures for details.

1. First remove the screws [1] from the back cover hatch and remove the hatch.
2. Then unplug connector(s) [3].
3. Remove the screws [2], gently lift the back cover from the set. Make sure that wires and flat coils are not damaged while lifting the back cover from the set.

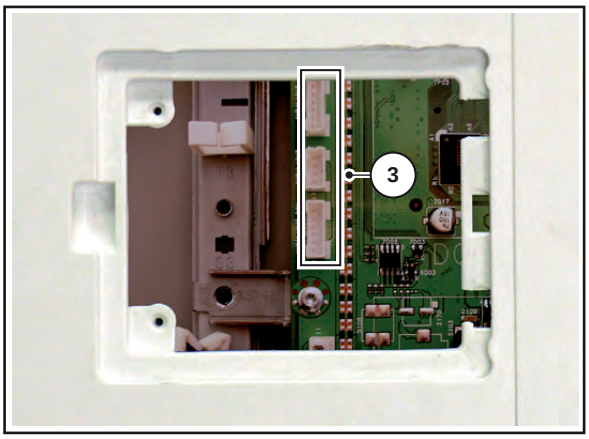

Figure 4-10 Back Cover Removal [1/2]

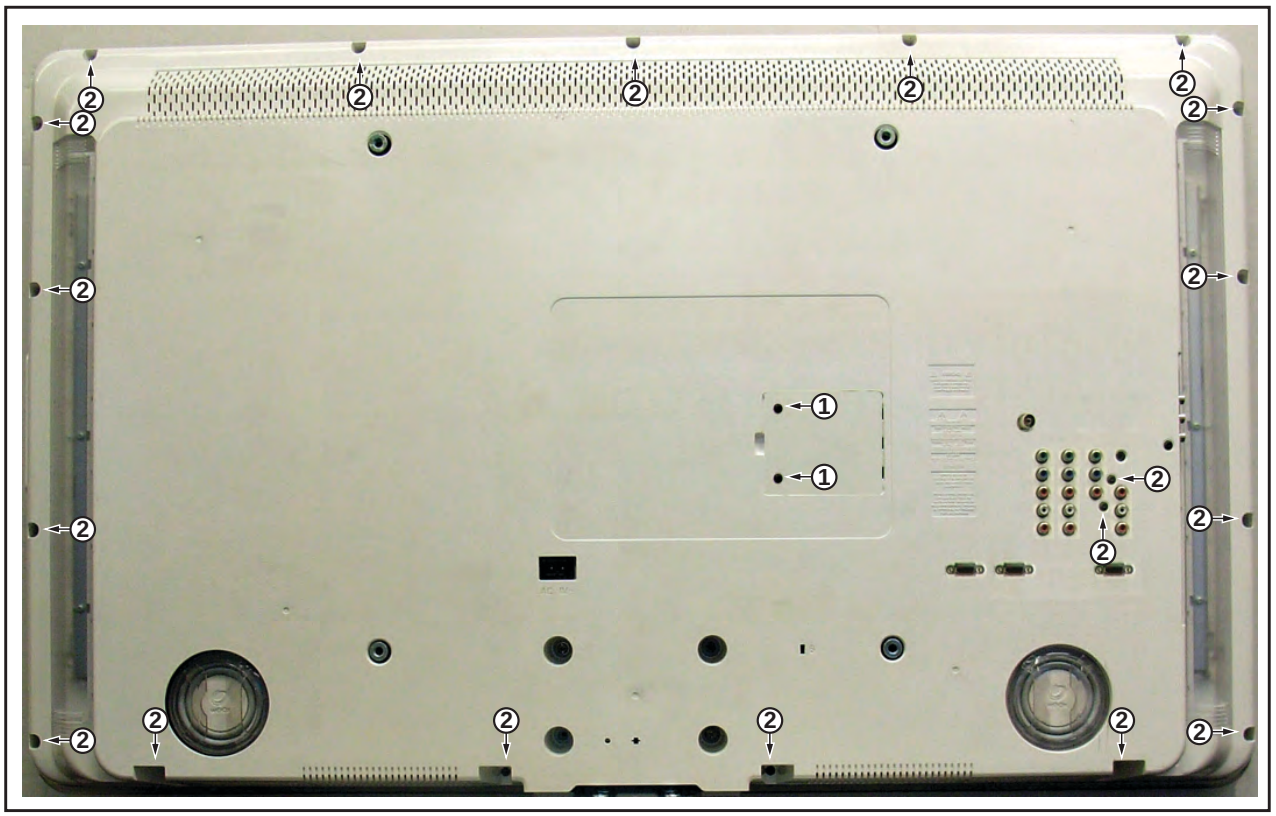

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Figure 4-11 Back Cover Removal [2/2]

4.3.2 Ambilight (if present)

Refer to next figure for details.

1. Unplug the connectors [1].
2. Remove the screws [2].
3. Pull the unit sidewards from the back cover.

When defective, replace the whole unit.

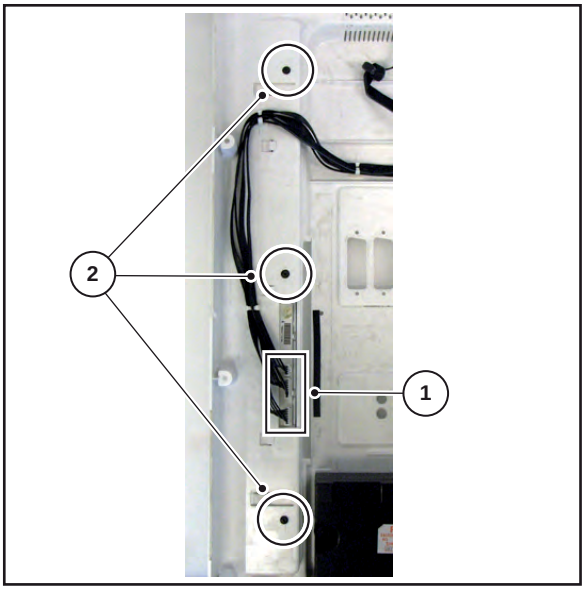

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Figure 4-12 Ambilight Unit

4.3.3 Loudspeaker (MG8 styling only)

1. Unplug the connectors.
2. Remove the screws.
3. Remove the loudspeaker.

4.3.4 Woofers (ME8 styling only)

Refer to next figure for details.
1. Remove the screws [1] and [2] and lift the whole unit from the back cover.

Take the speakers out together with their casing. When defective, replace the whole unit.

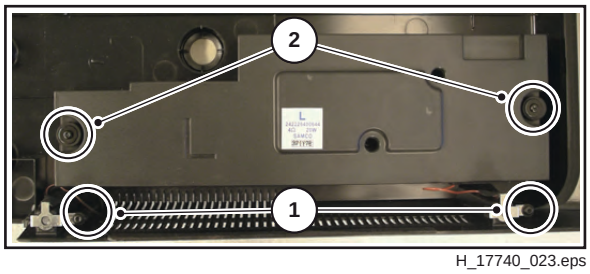

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Figure 4-13 Woofer

4.3.5 Tweeters (ME8 styling only)

Refer to next figure for details.
Warning: The speakers should never be connected or disconnected when the set is playing! This can damage the amplifiers on the SSB.
1. Unplug connector [1].
2. Remove screws [2] and remove unit.

Note: After repair, be sure to place the cable tapes (see also cable dressing figures for the exact location).

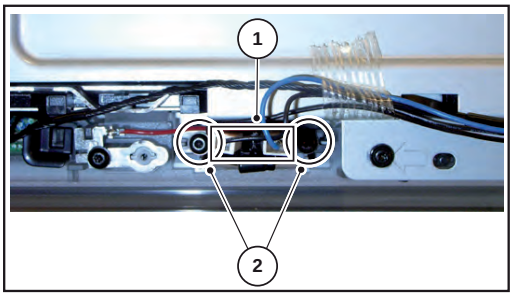

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Figure 4-14 Tweeter

4.3.6 IR & LED Board

Refer to next figure for details.
1. Unplug connectors [1].
2. Use a flat screw driver to release the clip by pushing it in the indicated direction [2].
3. Lift the board and take it out of the set.

When defective, replace the whole unit.

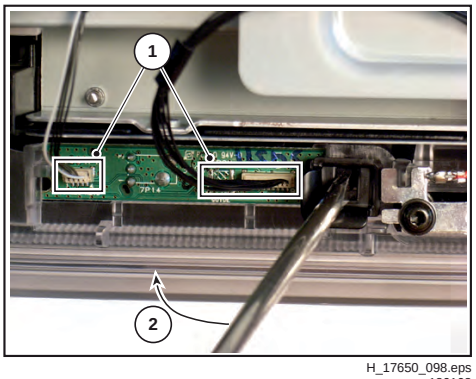

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Figure 4-15 IR & LED Board

4.3.7 Key Board

Refer to next figure for details.
1. Unplug the key board connector from the IR & LED board.
2. Remove the screws [1].
3. Lift the unit and take it out of the set.

When defective, replace the whole unit.

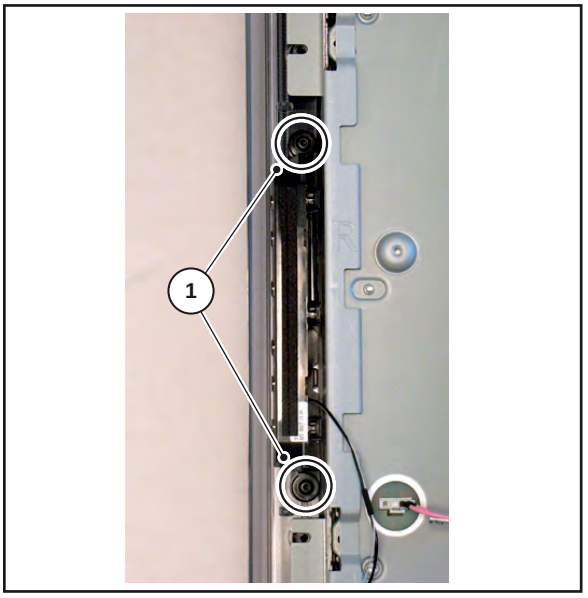

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Figure 4-16 Key Board

4.3.8 Display Supply Panel

Refer to next figure for details. **Note:** depending on the set execution, the used PSU can differ from figure below.
1. Unplug connectors [1].
2. Remove the fixation screws [2].
3. Take the board out.

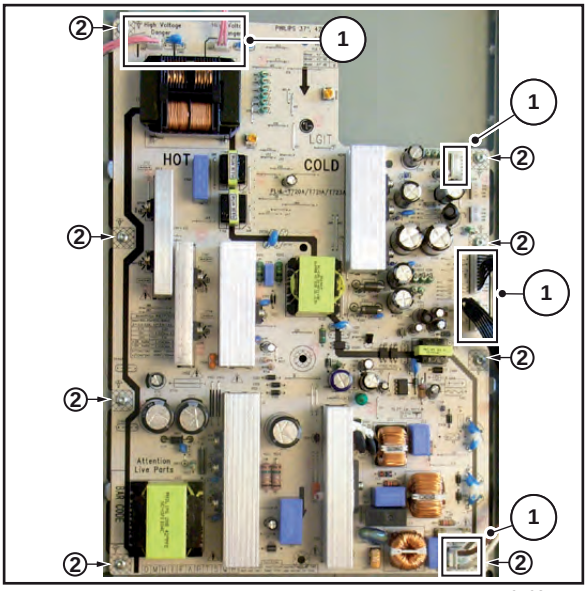

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Figure 4-17 Display Supply Panel

4.3.9 Small Signal Board (SSB)

Refer to below figure for details.
Caution: it is mandatory to remount all different screws at their original position during re-assembly. Failure to do so may result in damaging the SSB.
Refer to next figures or details.

1. Unplug the LVDS connector(s) [1].
   Caution: be careful, as this is a very fragile connector!
2. Unplug the connectors [2].
3. Remove the screws [3].
4. The SSB can now be taken out of the set, together with the front shield and the side cover.
5. To remove the shield, remove the screws [4] and lift it of while releasing clips [5].
6. Release clip [6] and slide the cover sidewards from the SSB.

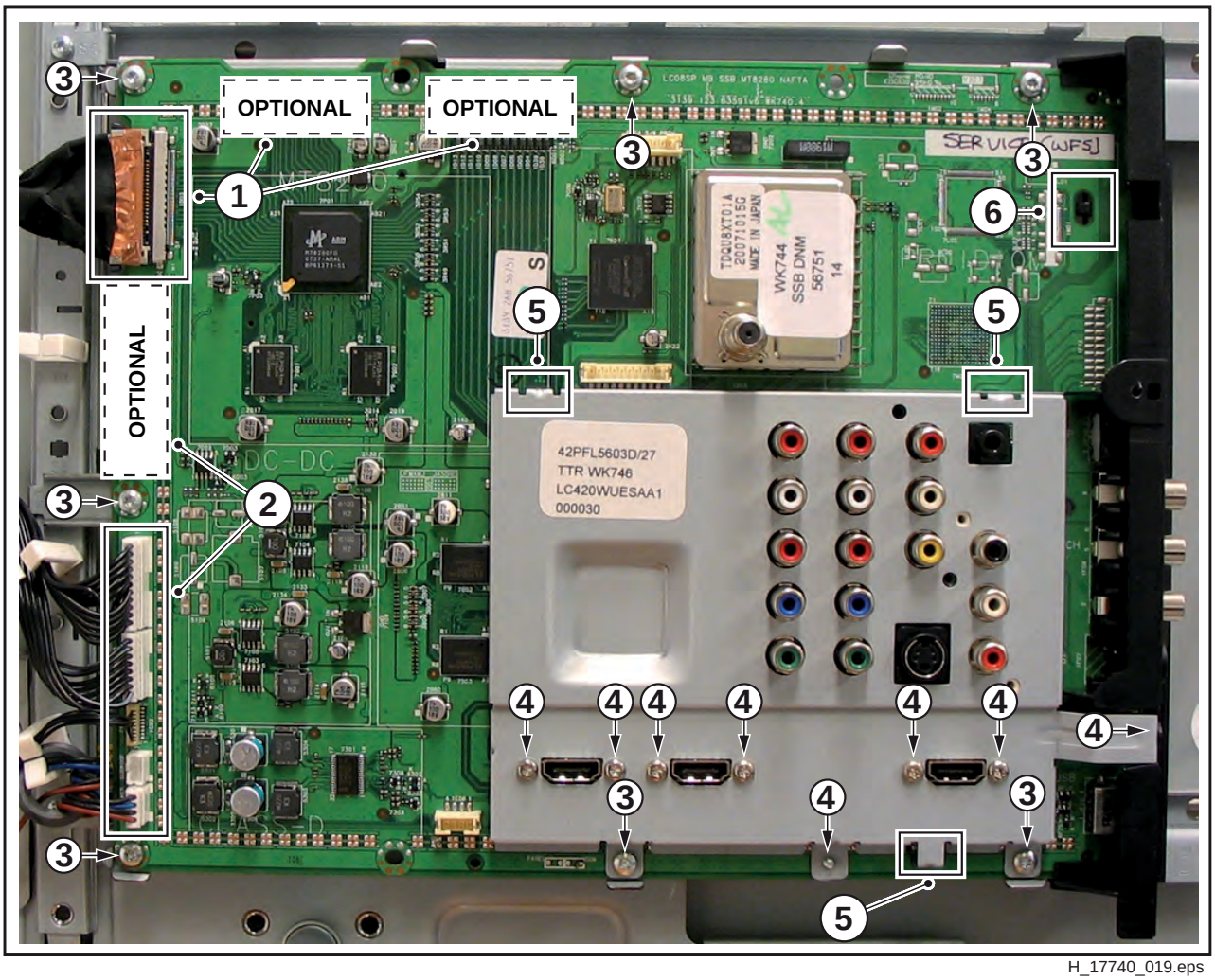

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Figure 4-18 Small Signal Board

4.3.10 LCD Panel

Refer to next figures for details. The figure used is from a 42-inch model, but the other screensizes have similar constructions.

1. Remove the stand.
2. Unplug the LVDS connector(s) [1].
   Caution: be careful, as this is a very fragile connector!
3. Unplug the connectors [2].
4. Remove the fixation screws [3] from rim.
5. Take the rim from the set.
6. Remove the fixation screws [4] and [5].
7. Lift the subframe from the set.
8. The LCD panel can now be lifted from the front cabinet.

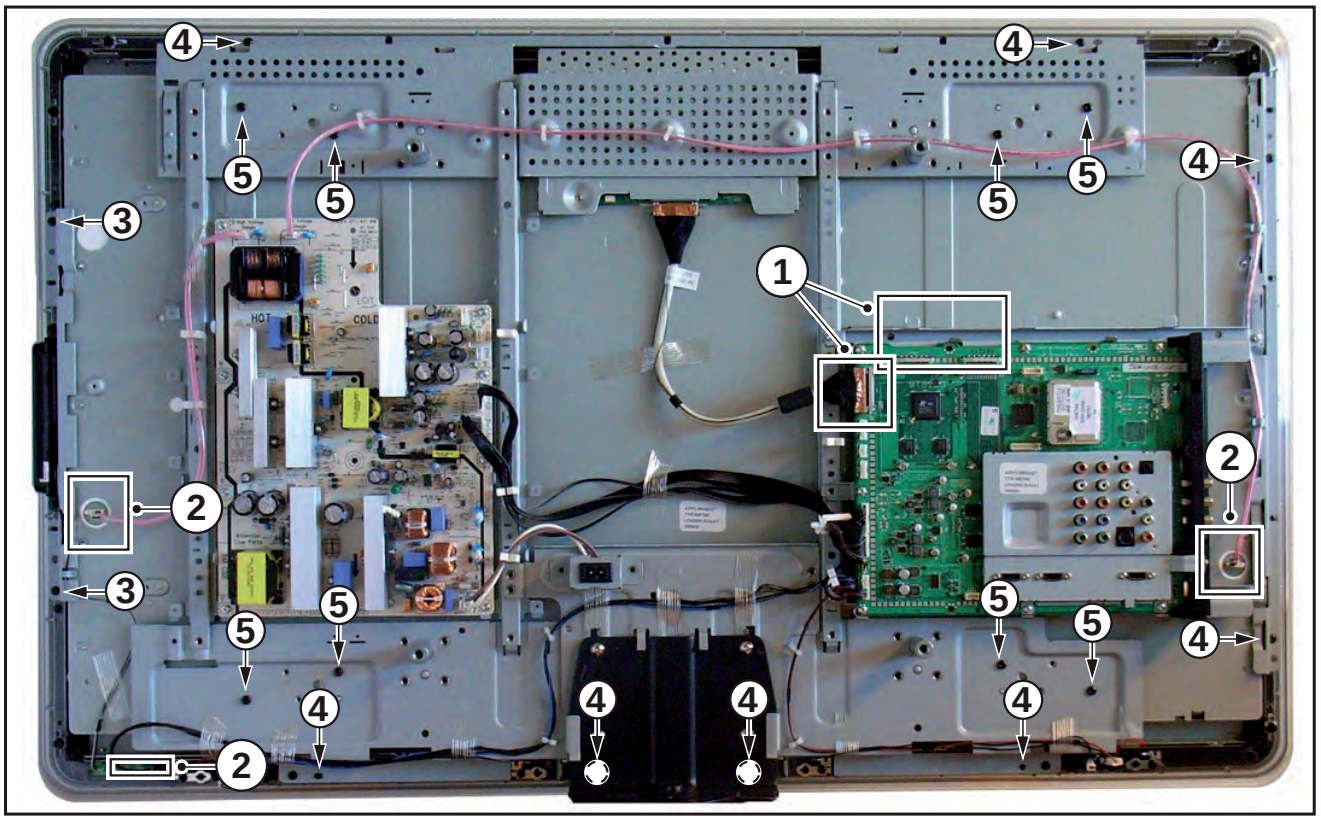

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Figure 4-19 LCD Panel (example from 42'' model)

4.4 Set Re-assembly

To re-assemble the whole set, execute all processes in reverse order.

Notes:

- **Important:** While re-assembling, make sure that all cables and cable tapes are placed in their original position. See figure "Cable dressing".
- Pay special attention not to damage the EMC foams on the SSB shields. Ensure that EMC foams are mounted correctly.

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

5.1 Test Points

In the chassis schematics and layout overviews, the test points are mentioned. In the schematics, test points are indicated with “Fxxx” or “Ixxx”, in the layout overviews with a “half-moon” sign. As most signals are digital, it will be difficult to measure waveforms with a standard oscilloscope. Several key ICs are capable of generating test patterns, which can be controlled via ComPair. In this way it is possible to determine which part is defective.

Perform measurements under the following conditions:
- Service Default Mode.
- Video: Color bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

The Service Mode feature is split into four parts:
- Service Default Mode (SDM).
- Service Alignment Mode (SAM).
- Customer Service Mode (CSM).
- Computer Aided Repair Mode (ComPair).

SDM and SAM offer features, which can be used by the Service engineer to repair/align a TV set. Some features are:
- A pre-defined situation to ensure measurements can be made under uniform conditions (SDM).
- Activates the blinking LED procedure for error identification when no picture is available (SDM).
- The possibility to overrule software protections when SDM is entered via the Service pins.
- Make alignments (e.g. White Tone), (de)select options, enter options codes, reset the error buffer (SAM).
- Display information (“SDM” or “SAM” indication in upper right corner of screen, error buffer, software version, operating hours, options and option codes, sub menus).

The CSM is a Service Mode that can be enabled by the consumer. The CSM displays diagnosis information, which the customer can forward to the dealer or call centre. In CSM mode, “CSM”, is displayed in the top right corner of the screen. The information provided in CSM and the purpose of CSM is to:
- Increase the home repair hit rate.
- Decrease the number of nuisance calls.
- Solved customers' problem without home visit.

ComPair Mode is used for communication between a computer and a TV on I2C /UART level and can be used by a Service engineer to quickly diagnose the TV set by reading out error codes, read and write in NVMs, communicate with ICs and the uP (PWM, registers, etc.), and by making use of a fault finding database. It will also be possible to up and download the software of the TV set via I2C with help of ComPair. To do this, ComPair has to be connected to the TV set via the ComPair connector, which will be accessible through the rear of the set (without removing the rear cover).

5.2.1 General

Some items are applicable to all Service Modes or are general. These are listed below.

Life Timer
During the life time cycle of the TV set, a timer is kept (called “Op. Hour”). It counts the normal operation hours (not the Stand-by hours). The actual value of the timer is displayed in SDM and SAM in a decimal value. Every two soft-resets increase the hour by +1. Standby hours are not counted.

Software Identification, Version, and Cluster
The software ID, version, and cluster will be shown in the main menu display of SDM, SAM, and CSM.
The screen will show: “**AAAABCD X.YY**”, where:
- **AAAA** is the chassis name: LC81.
- **B** is the region indication: E= Europe, A= AP/China, U= NAFTA, L= LATAM.
- **C** is the display indication: L= LCD, P= Plasma.
- **D** is the language/feature indication: P= Philips, M= Magnavox.
- **X** is the main version number: this is updated with a major change of specification (incompatible with the previous software version). Numbering will go from 1 - 9 and A - Z.
  - If the main version number changes, the new version number is written in the NVM.
  - If the main version number changes, the default settings are loaded.
- **YY** is the sub version number: this is updated with a minor change (backwards compatible with the previous versions) Numbering will go from 00 - 99.
  - If the sub version number changes, the new version number is written in the NVM.
  - If the NVM is fresh, the software identification, version, and cluster will be written to NVM.

Display Option Code Selection
When after an SSB or display exchange, the display option code is not set properly, it will result in a TV with “no display”. Therefore, **it is required** to set this display option code after such a repair.
To do so, press the following key sequence on a standard RC transmitter: “**062598**” directly followed by **MENU** and “**xxx**”, where “xxx” is a 3 digit decimal value of the panel type: see column “Panel Code” in table “Option Codes OP1...OP7” (ch. 8), or see sticker on the side/bottom of the cabinet. When the value is accepted and stored in NVM, the set will switch to Stand-by, to indicate that the process has been completed.

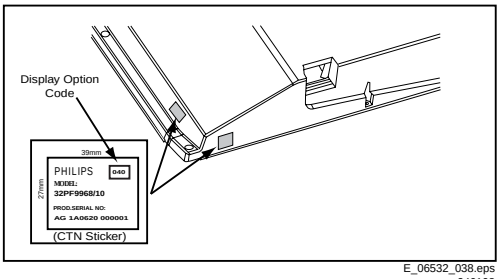

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Figure 5-1 Location of Display Option Code sticker

During this algorithm, the NVM-content must be filtered, because several items in the NVM are TV-related and not SSB-related (e.g. Model and Prod. S/N). Therefore, “Model” and “Prod. S/N” data is changed into “See Type Plate”.
In case a call centre or consumer reads “See Type Plate” in CSM mode, he needs to look to the side/bottom sticker to identify the set, for further actions.

5.2.2 Service Default Mode (SDM)

Purpose

Set the TV in SDM mode in order to be able to:

- Create a pre-defined setting for measurements to be made.
- Override software protections.
- Start the blinking LED procedure.
- Read the error buffer.
- Check the life timer.

Specifications

Table 5-1 SDM default settings

Region	Freq. (MHz)	Default syst.
Europe (except France), AP-PAL/-Multi	475.25	PAL B/G
France		SECAM L
NAFTA, AP-NTSC	**61.25 (channel 3)**	**NTSC M**
LATAM		PAL M

- Set linear video and audio settings to 50%, but volume to 25%. Stored user settings are not affected.
- All service-unfriendly modes (if present) are disabled, since they interfere with diagnosing/repairing a set. These service unfriendly modes are:
  - (Sleep) timer.
  - Blue mute/Wall paper.
  - Auto switch “off” (when there is no “ident” signal).
  - Hotel or hospital mode.
  - Child lock or parental lock (manual or via V-chip).
  - Skipping, blanking of “Not favorite”, “Skipped” or “Locked” presets/channels.
  - Automatic storing of Personal Preset or Last Status settings.
  - Automatic user menu time-out (menu switches back/ OFF automatically.
  - Auto Volume levelling (AVL).

How to Activate

To activate SDM, use **one** of the following methods:

- Press the following key sequence on the remote control transmitter: “**062596**” directly followed by the **MENU** button (do not allow the display to time out between entries while keying the sequence).
- Short one of the “Service” jumpers on the TV board during cold start (see Figures “Service jumper”). Then press the mains button (remove the short after start-up).
  Caution: Activating SDM by shorting “Service” jumpers will override the DC speaker protection (error 1), the General I2C error (error 4), and the Trident video processor error (error 5). When doing this, the service-technician must know exactly what he is doing, as it could damage the television set.

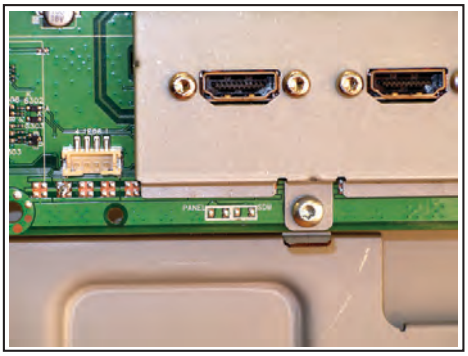

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Figure 5-2 Service jumper (SSB component side)

On Screen Menu

After activating SDM, the following screen is visible, with SDM in the upper right corner of the screen to indicate that the television is in Service Default Mode.

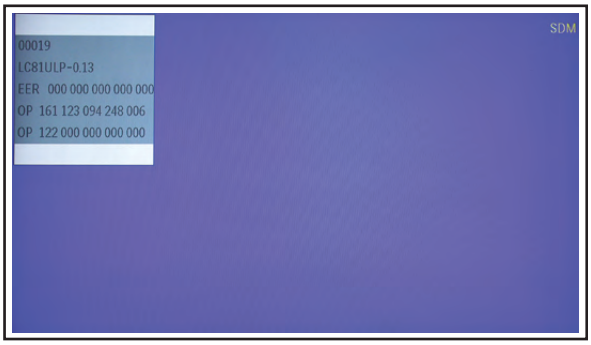

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Figure 5-3 SDM menu

Menu explanation:

- **HHHHH**: Are the operating hours (in decimal).
- **AAAABCD-X.YY**: See paragraph “Service Modes” -> “General” -> “Software Identification, Version, and Cluster” for the SW name definition.
- **EER**: Shows all errors detected since the last time the buffer was erased. Five errors possible.
- **OP**: Used to read-out the option bytes. See “Options” in the Alignments section for a detailed description. Ten codes (in two rows) are possible.

How to Navigate

As this mode is read only, there is not much to navigate. To switch to other modes, use one of the following methods:

- Command MENU from the user remote will enter the normal user menu (brightness, contrast, color, etc...) with “SDM” OSD remaining, and pressing MENU key again will return to the last status of SDM again.
- To prevent the OSD from interfering with measurements in SDM, command “OSD” or “i+” (“STATUS” or “INFO” for NAFTA and LATAM) from the user remote will toggle the OSD “on/off” with “SDM” OSD remaining always “on”.
- Press the following key sequence on the remote control transmitter: “**062596**” directly followed by the **OSD/ STATUS/INFO/i+** button to switch to SAM (do not allow the display to time out between entries while keying the sequence).

How to Exit

Switch the set to STANDBY by pressing the mains button on the remote control transmitter or on the television set.
If you switch the television set “off” by removing the mains (i.e., unplugging the television), the television set will remain in SDM when mains is re-applied, and the error buffer is not cleared. The error buffer will only be cleared when the “clear” command is used in the SAM menu.

Note:

- If the TV is switched “off” by a power interrupt while in SDM, the TV will show up in the last status of SDM menu as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is in Factory mode by accident (with “F” displayed on screen), by pressing and hold “VOL-“ and “CH-” together should leave Factory mode.

5.2.3 Service Alignment Mode (SAM)

Purpose
- To change option settings.
- To display / clear the error code buffer.
- To perform alignments.

Specifications
- Operation hours counter (maximum five digits displayed).
- Software version, error codes, and option settings display.
- Error buffer clearing.
- Option settings.
- Software alignments (White Tone).
- NVM Editor.
- Set screen mode to full screen (all content is visible).

How to Activate

To activate SAM, use one of the following methods:
- Press the following key sequence on the remote control transmitter: "**062596**" directly followed by the **OSD/ STATUS/INFO/i+** button (it depends on region which button is present on the RC). Do not allow the display to time out between entries while keying the sequence.
- Or via ComPair.

After entering SAM, the following screen is visible, with SAM in the upper right corner of the screen to indicate that the television is in Service Alignment Mode.

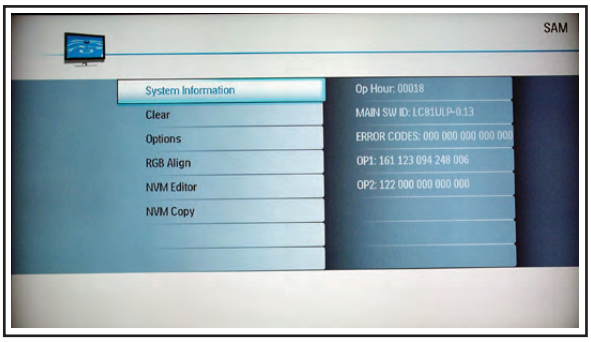

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Figure 5-4 SAM menu

Menu explanation:
1. **System Information:**
   - **Op. Hour.** This represents the life timer. The timer counts normal operation hours, but does not count Stand-by hours.
   - **MAIN SW ID.** See paragraph "Service Modes" -> "General" -> "Software Identification, Version, and Cluster" for the SW name definition.
   - **ERROR CODES.** Shows all errors detected since the last time the buffer was erased. Five errors possible.
   - **OP1 / OP2.** Used to read-out the option bytes. See "Options" in the Alignments section for a detailed description. Ten codes are possible.
2. **Clear.** Erases the contents of the error buffer. Select the CLEAR menu item and press the MENU RIGHT key. The content of the error buffer is cleared.
3. **Options.** To set the option bits. See "Options" in the "Alignments" chapter for a detailed description.
4. **RGB Align.** To align the White Tone. See "White Tone" in the "Alignments" chapter for a detailed description.
5. **NVM Editor.** To change the NVM data in the television set. See also paragraph "Fault Finding and Repair Tips".
6. **NVM Copy.** Gives the possibility to copy/load the NVM file to/from an USB stick.
   Important: NVM data copied to a USB memory device is named "**TV2USB.bin**". When copied back to a TV, the file first must be renamed to "**USB2TV.bin**".

How to Navigate
- In the SAM menu, select menu items with the UP/DOWN keys on the remote control transmitter. The selected item will be indicated. When not all menu items fit on the screen, use the UP/DOWN keys to display the next / previous menu items.
- With the LEFT/RIGHT keys, it is possible to:
  – Activate the selected menu item.
  – Change the value of the selected menu item.
  – Activate the selected sub menu.
- When you press the MENU button twice while in top level SAM, the set will switch to the normal user menu (with the SAM mode still active in the background). To return to the SAM menu press the MENU button.
- The "**OSD/STATUS/INFO/i+**" key from the user remote will toggle the OSD "on/off" with "SAM" OSD remaining always "on".
- Press the following key sequence on the remote control transmitter: "**062596**" directly followed by the **MENU** button to switch to SDM (do not allow the display to time out between entries while keying the sequence).

How to Store SAM Settings

To store the settings changed in SAM mode (except the OPTIONS and RGB ALIGN settings), leave the top level SAM menu by using the POWER button on the remote control transmitter or the television set. The mentioned exceptions must be stored separately via the STORE button.

How to Exit

Switch the set to STANDBY by pressing the mains button on the remote control transmitter or the television set.

Note:
- When the TV is switched "off" by a power interrupt while in SAM, the TV will show up in "normal operation mode" as soon as the power is supplied again. The error buffer will not be cleared.
- In case the set is in Factory mode by accident (with "F" displayed on screen), by pressing and hold "VOL-" and "CH-" together should leave Factory mode.

5.2.4 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the TV's operation settings. A call centre can instruct the customer (by telephone) to enter CSM in order to identify the status of the set. This helps them to diagnose problems and failures in the TV before making a service call. The CSM is a read-only mode; therefore, modifications are not possible in this mode.

Specifications

- Ignore "Service unfriendly modes".
- Line number for every line (to make CSM language independent).
- Set the screen mode to full screen (all contents on screen is visible).
- After leaving the Customer Service Mode, the original settings are restored.
- Possibility to use "CH+" or "CH-" for channel surfing, or enter the specific channel number on the RC.

How to Activate

To activate CSM, press the following key sequence on a standard remote control transmitter: "**123654**" (do not allow the display to time out between entries while keying the sequence).

Upon entering the Customer Service Mode, the following screen will appear:

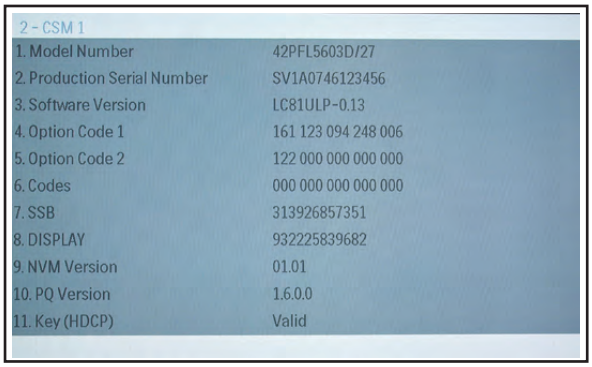

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Figure 5-5 CSM menu -1- (example)

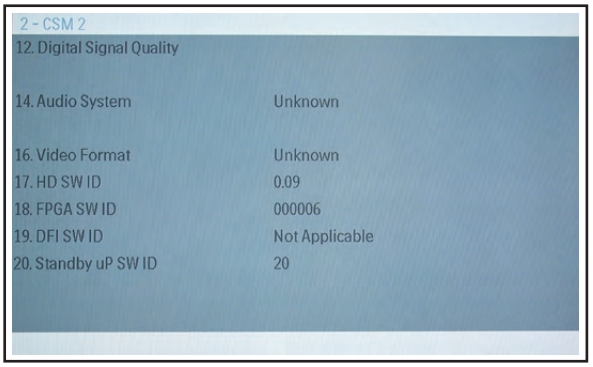

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Figure 5-6 CSM menu -2- (example)

Menu Explanation

1. **Model Number.** Type number, e.g. 42PFL5603D/27. (*)
2. **Production Serial Number.** Product serial no., e.g. SV1A0805123456 (*). SV= Production center, 1= BOM code, A= Service version change code, 08= Production year, o5= Production week, 123456= Serial number.
3. **Software Version.** Main software cluster and version is displayed.
4. **Option Code 1.** Option code information (group 1).
5. **Option Code 1.** Option code information (group 2).
6. **Codes.** Error buffer contents.
7. **SSB.** Indication of the SSB factory ID (= 12nc). (*)
8. **Display.** Indication of the display ID (=12 nc). (*)
9. **NVM Version.** The NVM software version no.
10. **PQ Version.** PQ (picture quality) data version. This is a subset of the main SW.
11. **Key (HDCP).** Indicates if the HDMI keys (or HDCP keys) are valid or not.
12. **Digital Signal Quality.** Tuner signal condition in percentage.
13. Blank.
14. **Audio System.** Gives information about the audio system of the selected transmitter (MONO/STEREO).
15. **HDAU.** HDMI audio stream detection. "YES" means audio stream detected. "NO" means no audio stream present. Only displayed when HDMI source is selected.
16. **Video Format.** Gives information about the video format of the selected transmitter (480p30/720p60/1080i50/1080i60, etc...). Is applicable to both HDMI and CVI sources.
17. **HD SW ID.** Shows the HD DNM software version.
18. **FPGA SW ID.** Shows the FPGA software version (if present).
19. **DFI SW ID.** Shows the DFI software version (if present).
20. **Standby uP SW ID.** Shows the Standby Processor software version.

(*) If an NVM IC is replaced or initialized, these items must be re-written to the NVM. ComPair will foresee in a possibility to do this.

How to Exit

To exit CSM, use one of the following methods:

- Press the MENU button twice on the remote control transmitter.
- Press the POWER button on the remote control transmitter.
- Press the POWER button on the television set.

5.3 Service Tools

5.3.1 ComPair

Introduction
ComPair (Computer Aided Repair) is a Service tool for Philips Consumer Electronics products. and offers the following:
1. ComPair helps you to quickly get an understanding on how to repair the chassis in a short and effective way.
2. ComPair allows very detailed diagnostics and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C or UART commands yourself, because ComPair takes care of this.
3. ComPair speeds up the repair time since it can automatically communicate with the chassis (when the uP is working) and all repair information is directly available.
4. ComPair features TV software up possibilities.

Specifications
ComPair consists of a Windows based fault finding program and an interface box between PC and the (defective) product. The (new) ComPair II interface box is connected **to the PC** via an USB cable. For the TV chassis, the ComPair interface box and the TV communicate via a bi-directional cable via the service connector(s).

How to Connect
This is described in the ComPair chassis fault finding database.

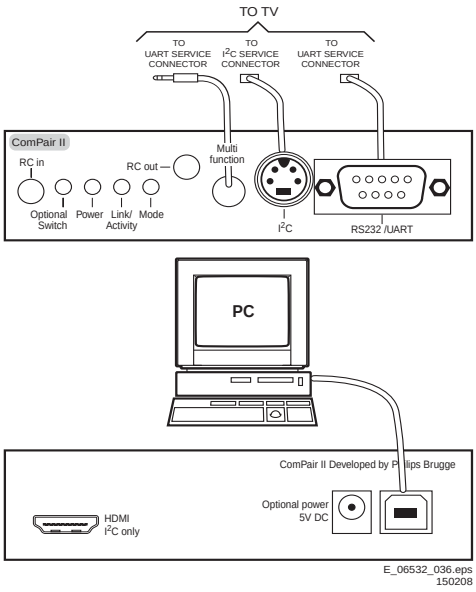

Figure 5-7 ComPair II interface connection

Caution: It is compulsory to connect the TV to the PC as shown in the picture above (with the ComPair interface in between), as the ComPair interface acts as a level shifter. If one connects the TV directly to the PC (via UART), ICs will be blown!

How to Order
ComPair II order codes:
- ComPair II interface: 3122 785 91020.
- ComPair UART interface cable: 3138 188 75051.
- Program software can be downloaded from the Philips Service website.

Note: If you encounter any problems, contact your local support desk.

5.3.2 LVDS Tool

Support of the LVDS Tool has been discontinued.

5.4 Error Codes

5.4.1 Introduction

Error codes are required to indicate failures in the TV set. In principle a unique error code is available for every:
- Activated protection.
- Failing I2C device.
- General I2C error.
- SDRAM failure.

The last five errors, stored in the NVM, are shown in the Service menu's. This is called the error buffer.
The error code buffer contains all errors detected since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is displayed at the left side and all other errors shift one position to the right.
An error will be added to the buffer if this error differs from any error in the buffer. The last found error is displayed on the left.
An error with a designated error code may **never** lead to a deadlock situation. This means that it must always be diagnosable (e.g. error buffer via OSD or blinking LED procedure, ComPair to read from the NVM).
In case a failure identified by an error code automatically results in other error codes (cause and effect), only the error code of the MAIN failure is displayed.

Example: In case of a failure of the I2C bus (CAUSE), the error code for a "General I2C failure" and "Protection errors" is displayed. The error codes for the single devices (EFFECT) is not displayed. All error codes are stored in the same error buffer (TV's NVM) except when the NVM itself is defective.

5.4.2 How to Read the Error Buffer

You can read the error buffer in 3 ways:
- On screen via the SAM/SDM/CSM (if you have a picture). Example:
  - **ERROR: 0 0 0 0 0** : No errors detected
  - **ERROR: 6 0 0 0 0** : Error code 6 is the last and only detected error
  - **ERROR: 9 6 0 0 0** : Error code 6 was detected first and error code 9 is the last detected (newest) error
- Via the blinking LED procedure (when you have no picture). See "The Blinking LED Procedure".
- Via ComPair.

5.4.3 Error Codes

In case of non-intermittent faults, write down the errors present in the error buffer and clear the error buffer before you begin the repair. This ensures that old error codes are no longer present.
If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error and not the actual cause of the problem (for example, a fault in the protection detection circuitry can also lead to a protection).

Code	Error Description	Detection via:	Type	Remarks
0	No Error	-- -- --	N/A	-- -- --
1	DC Protection	MT5382 (7A01)	Protection	DC_PROT = Low
2	+12V Failure	WT61P7 (7E23)	Protection	POWER_DOWN = Low
3	Stand-by Controller I2C	I2C0 Bus	Protection	Communication Error with WT61P7
4	General I2C	I2C0 Bus	Error Log	Communication Error on I2C0 Bus
5 #	MT8280 I2C	I2C0 Bus	Error Log	Communication Error with MT8280
6	System NVM I2C	I2C0 Bus	Protection	Communication Error with System NVM
7	Tuner	Tuner I2C Bus	Error Log	Communication Error with Tuner TDQU
8	IF/PLL Demodulator	Tuner I2C Bus	Error Log	Communication Error with TDA9886
9	Ambilight FPGA	I2C0 Bus	Error Log	Communication Error with EC2S
10	Reserved	-- -- --	N/A	-- -- --
11	Reserved	-- -- --	N/A	-- -- --
12	Reserved	-- -- --	N/A	-- -- --
13	HDMI Switch I2C	I2C0 Bus	Error Log	Communication Error with Sil9185
14	MT8280 DRAM1	DRAM R/W (7B02/03)	Error Log	R/W Error with DRAM1 or DRAM2
15	Reserved	-- -- --	N/A	-- -- --
16	Reserved	-- -- --	N/A	-- -- --
17	Reserved	-- -- --	N/A	-- -- --
18 #	Channel Decoder I2C	I2C0 Bus	Error Log	Communication Error with MT5112 (reserved for BDS modules)
19 #	Pro Idiom I2C	I2C0 Bus	Error Log	Communication Error with Pro Idiom (reserved for BDS modules)
21 #	Bolt-On HDMI NVM I2C	I2C0 Bus	Error Log	Communication Error with BDS Bolt-On (reserved for BDS modules)
#	If IC/board available.			

5.4.4 How to Clear the Error Buffer

The error code buffer is cleared in the following cases:
- By using the CLEAR command in the SAM menu:
- If the contents of the error buffer have not changed for 50 hours, the error buffer resets automatically.

Note: If you exit SAM by disconnecting the mains from the television set, the error buffer is not reset.

5.5 The Blinking LED Procedure

5.5.1 Introduction

The software is capable of identifying different kinds of errors. Because it is possible that more than one error can occur over time, an error buffer is available, which is capable of storing the last five errors that occurred. This is useful if the OSD is not working properly.

Errors can also be displayed by the blinking LED procedure. The method is to repeatedly let the front LED pulse with as many pulses as the error code number, followed by a period of 1.5 seconds in which the LED is “off”. Then this sequence is repeated.

Example (1): error code 4 will result in four times the sequence LED “on” for 0.25 seconds / LED “off” for 0.25 seconds. After this sequence, the LED will be “off” for 1.5 seconds. Any RC5 command terminates the sequence. Error code LED blinking is in red color.

Example (2): the content of the error buffer is “**12 9 6 0 0**” After entering SDM, the following occurs:
- 1 long blink of 5 seconds to start the sequence,
- 12 short blinks followed by a pause of 1.5 seconds,
- 9 short blinks followed by a pause of 1.5 seconds,
- 6 short blinks followed by a pause of 1.5 seconds,
- 1 long blink of 1.5 seconds to finish the sequence,
- The sequence starts again with 12 short blinks.

5.5.2 Displaying the Entire Error Buffer

Additionally, the entire error buffer is displayed when Service Mode “SDM” is entered. In case the TV set is in protection or Stand-by: The blinking LED procedure sequence (as in SDM-mode in normal operation) must be triggered by the following RC sequence: “**MUTE” “062500” “OK**”.
In order to avoid confusion with RC5 signal reception blinking, this blinking procedure is terminated when a RC5 command is received.

5.6 Fault Finding and Repair Tips

Notes:
- It is assumed that the components are mounted correctly with correct values and no bad solder joints.
- **Before** any fault finding actions, check if the correct options are set.

5.6.1 Software Protections

Most of the protections and errors use either the stand-by or the micro processor as detection device. Since in these cases, checking of observers, polling of ADCs, and filtering of input values are all heavily software based, these protections are referred to as software protections.
There are several types of software related protections, solving a variety of fault conditions:
- **Protections related to supplies:** check of the 12V.
- **Protections related to breakdown of the safety check mechanism.** E.g. since the protection detections are done by means of software, failing of the software will have to initiate a protection mode since safety cannot be guaranteed any more.

Remark on the Supply Errors
The detection of a supply dip or supply loss during the normal playing of the set does not lead to a protection, but to a cold reboot of the set. If the supply is still missing after the reboot, the TV will go to protection.

Protections during Start-up
During TV start-up, some voltages and IC observers are actively monitored to be able to optimize the start-up speed, and to assure good operation of all components. If these monitors do not respond in a defined way, this indicates a malfunction of the system and leads to a protection.

5.6.2 Hardware Protections

The only real hardware protection in this chassis is (in case of an audio problem) the audio protection circuit that will trigger the uP to switch “off” the TV.

Repair Tip
- It is also possible that you have an audio DC protection because of an interruption in one or both speakers (the DC voltage that is still on the circuit cannot disappear through the speakers).
  Caution: (dis)connecting the speaker wires during the ON state of the TV at high volume can damage the audio amplifier.

5.6.3 NVM Editor

In some cases, it can be convenient if one directly can change the NVM contents. This can be done with the “NVM Editor” in SAM mode. With this option, single bytes can be changed.

Caution:
- **Do not change these, without understanding the function of each setting, because incorrect NVM settings may seriously hamper the correct functioning of the TV set!**
- Always write down the existing NVM settings, before changing the settings. This will enable you to return to the original settings, if the new settings turn out to be incorrect.

Table 5-2 NVM editor overview

	Hex	Dec	Description
Address	0x000A	10	Existing value
Value	0x0000	0	New value
Store	Store?		

5.6.4 Load Default NVM Values

It is possible to download default values automatically into the NVM in case a blank NVM is placed or when the NVM first 20 address contents are “FF”. After the default values are downloaded, it is possible to start-up and to start aligning the TV set. To initiate a forced default download the following action has to be performed:
1. Switch “off” the TV set with the mains cord disconnected from the wall outlet (it does not matter if this is from “Stand-by” or “Off” situation).
2. Short-circuit the SDM jumpers on the SSB (keep short circuited).
3. Press “P+” or “CH+” on the local keyboard (and keep it pressed).
4. Reconnect the mains supply to the wall outlet.
5. Release the “P+” or “CH+” when the set is started up and has entered SDM.

When the downloading has completed successfully, the set should be into Stand-by, i.e. red LED on.

Alternative method:
It is also possible to upload the default values to the NVM with ComPair in case the SW is changed, the NVM is replaced with a new (empty) one, or when the NVM content is corrupted. After replacing an EEPROM (or with a defective/no EEPROM), default settings should be used to enable the set to start-up and allow the Service Default Mode and Service Alignment Mode to be accessed.

5.6.5 Display option code

Caution: In case you have replaced the SSB, always check the display option code in SAM, even if you have picture. With a wrong display option code it is possible that you have picture, but that in certain conditions you have unwanted side-effects.

5.6.6 Start-up/Shut-down Flowcharts

On the next pages you will find start-up and shut-down flowcharts, which might be helpful during fault finding.

POWER STATES

In this chassis, there are six possible power states as follows:

- Power OFF
- ON
- STANDBY
- SEMI-STANDBY
- Special Panel Mode
- PROTECTION

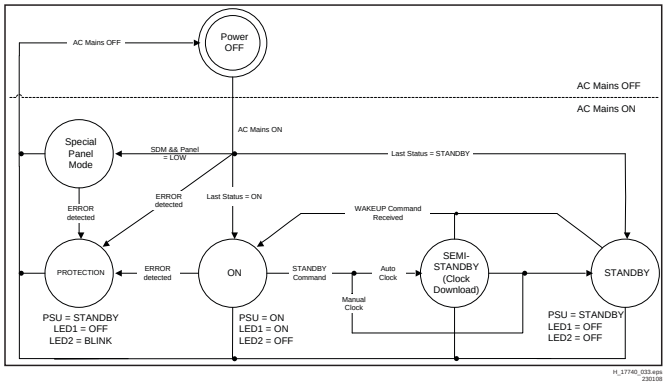

Figure 5-8 Power States

POWER OFF

In “Power OFF” mode, the system is completely switched “off” from AC mains. When AC power is applied, the system checks for last status. Depending on the last standby status stored in the system EEPROM, this mode can then transit to “ON” or “STANDBY” mode.

ON

This is the normal operating mode, indicated by the “on” LED. All the power supply lines are available and depending on the sub-mode, all the circuits in the system may be active. From this mode it shall be possible to transit to “STANDBY”, “SEMI-STANDBY” and “PROTECTION” mode, or to “Power OFF” mode if AC mains are switched “off”. The sub-modes are:

- Active Mode (Normal Consumer Mode)
- Service Modes
- Panel Modes
- Factory Modes

STANDBY

The total power consumption of the system in this mode shall be equal or less than 150 mW. This state is indicated by no LED when AC mains is switched “on”. Only the standby controller WT61P7 is operational in this state, where only +3V3stby power supply is available. From this mode it shall be possible to transit to the “ACTIVE” or “Power OFF” mode if AC mains are switched “off”.

SEMI-STANDBY

The semi-standby state is only accessed during transition from ACTIVE to STANDBY when the auto clock feature is switched “on”. The clock information download is carried out in this state before proceeding to STANDBY.

SPECIAL PANEL MODE

The Special Panel Mode is **only** used during manufacturing process to program the system EEPROM. In this mode, the SDA0 and SCL0 ports of MT5382 are set to high impedance after SDM and PANEL pins are both detected as “low” during startup. This mode can be exited using a power recycle.

PROTECTION

This state is entered when an error has been detected at startup or in the “ACTIVE” mode. All switched power supply lines are turned “off” with only +3V3stby remaining “on”; similar to “STANDBY” mode. This state is indicated by the blinking red front LED with the blinking sequence denoting the type of error detected.

When the system enters the protection mode due to a critical error, it should be turned “off” and the failure cause needs to be resolved. The system will function normally again after performing a power recycling once all protection causing failures have been resolved.

START-UP SEQUENCE

There are two cases of start-up sequences, namely:

- AC On and
- Standby Wake-up

See also figure on next page.

AC ON

In the case of start-up from AC mains, all PSU voltages start to turn “on” as the hardware default of the active “low” STANDBY (controlled by Standby Controller WT61P7’s STANDBY signal) signal to the PSU is pulled “low” with respect to ground.

The MT5382 starts running boot loader once the hardware reset circuit is released. The system will then check the last standby status from the system EEPROM to determine whether to complete the system start-up (load image, turn on the audio, display etc) or proceed to standby and wait for wake-up command from user. The Standby Controller then proceeds to verify the power status of the +12V and sends the system to protection in case of any failures. Special Panel, SDM, and PANEL modes are detected as well.

System recovery is always handled by Standby Controller. Watchdog for MT5382 and MT8280 (if present) will be only enabled during startup, and these components are able to differentiate the normal startup and watchdog reset to trigger system reset when applicable. The alive checking mechanism kicks in after system startup is completed.

STANDBY WAKEUP

When the system receives a command to wake-up from standby, the Standby Controller sets the STANDBY signal “low” to turn “on” the switched power, and similarly detects for the presence of +12V. The MT5382 waits for +3V3_SW to be available before loading its image. The significance of this voltage detection is due to the flash is also being powered by the same mentioned voltage.

The following figure shows the start-up flowchart for both “AC On” and “Standby Wake-up”:

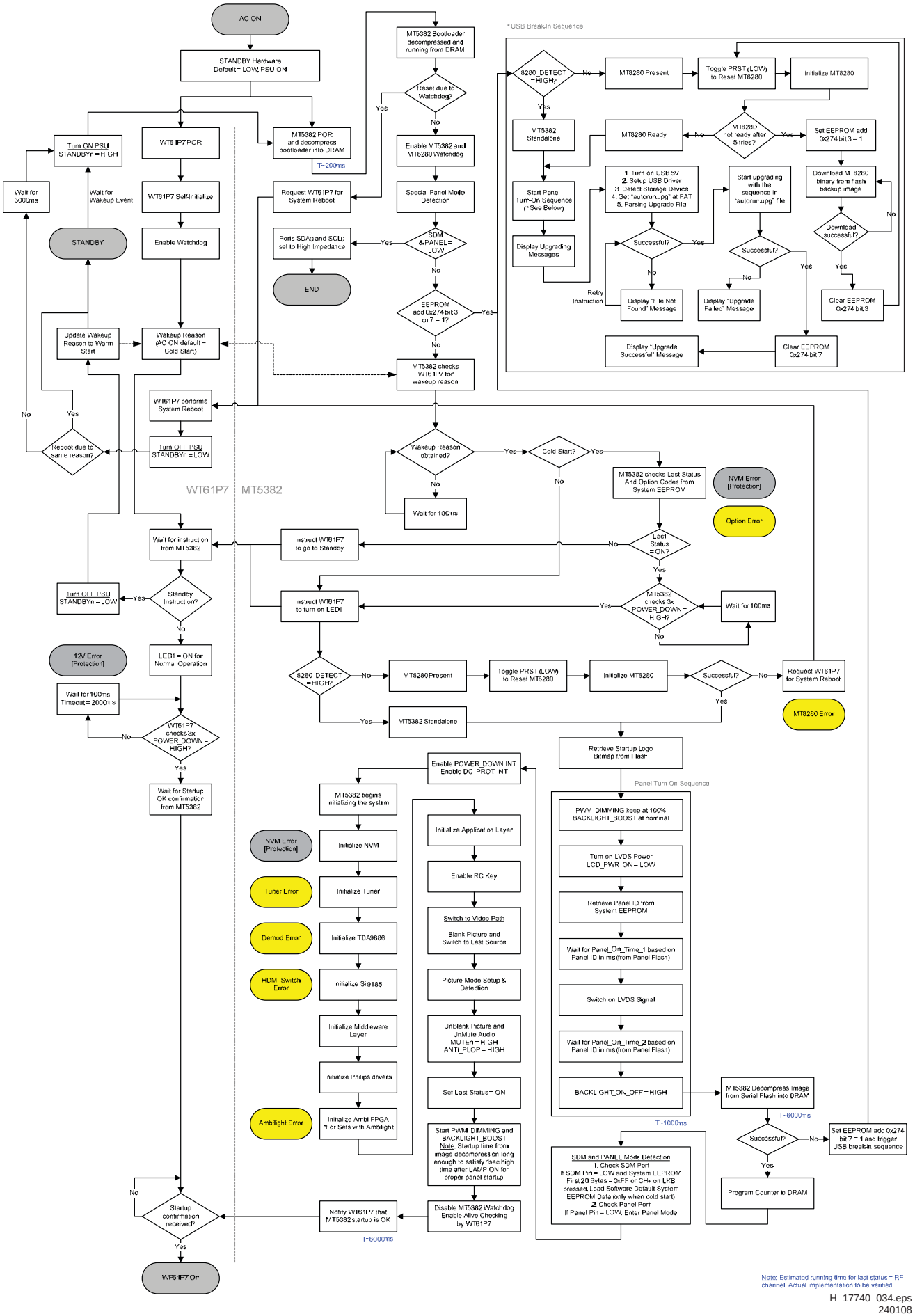

Figure 5-9 Start-up flowchart

STANDBY SEQUENCE

The following flowchart depicts the Standby (plus Semi-Standby condition) sequence:

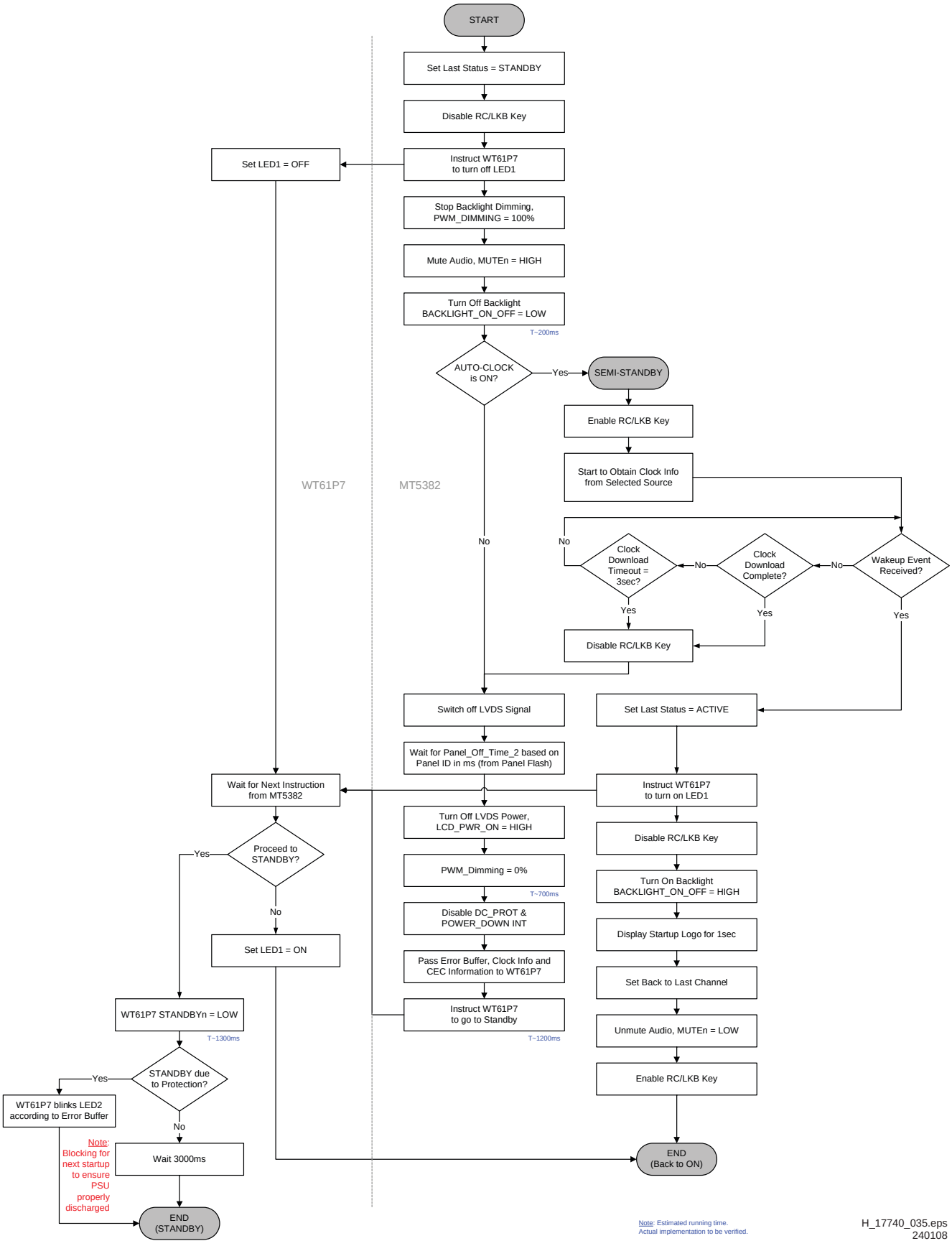

Figure 5-10 Standby flowchart

POWERDOWN SEQUENCE
The following figure shows the power-down sequence flowchart:

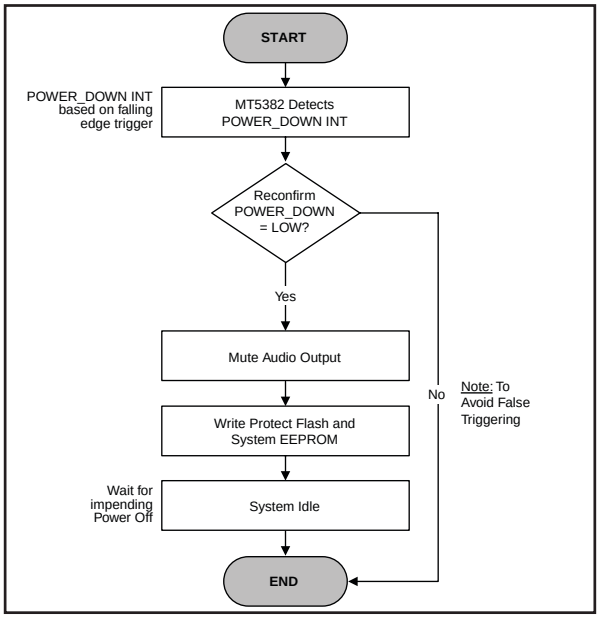

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Figure 5-11 Power-down flowchart

The power-down condition is detected by the MT5382 POWER_DOWN signal which is an interrupt pin. A “low” level on this line signifies that power-down is detected. The two major activities that occur over this operation is the muting of audio output and write protecting the system flash and EEPROM.

DC PROTECTION
The following figure shows the DC_PROT interrupt flowchart:

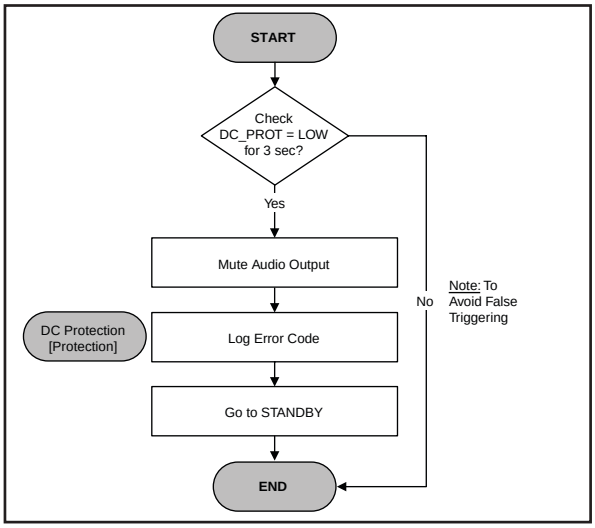

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Figure 5-12 DC Protection flowchart

5.7 Software Upgrading

5.7.1 Introduction

It is possible **for the user** to upgrade the **main** software via the USB port. This allows replacement of a software image in a stand alone set, without the need of an E-JTAG debugger. A description on how to upgrade the main software can be found in the DFU or on the Philips website.

5.7.2 Main Software Upgrade

Automatic Software Upgrade

In “normal” conditions, so when there is no major problem with the TV, the main software and the default software upgrade application can be upgraded with the “autorun.upg” (FUS part in the one-zip file). This can also be done by the consumers themselves, but they will have to get their software from the commercial Philips website or via the Software Update Assistant in the user menu (see DFU). The “autorun.upg” file must be placed in the root of your USB stick.

How to upgrade:

1. Copy “autorun.upg” to the root of your USB stick.
2. Insert USB stick in the side I/O while the set is in “On” mode. The set will restart and the upgrading will start automatically. As soon as the programming is finished, you will get the message that you can remove your USB stick and restart the set.

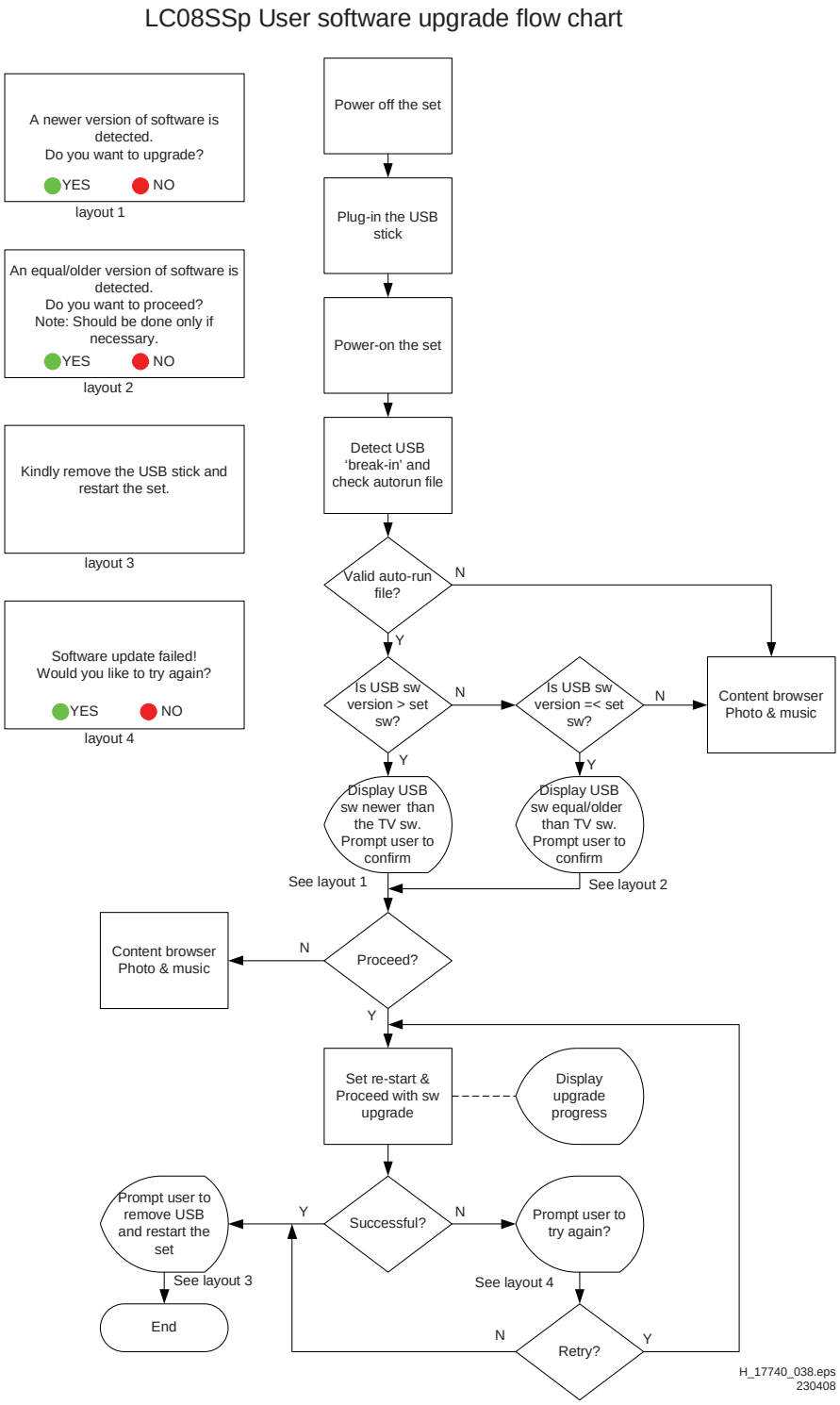


Figure 5-13 SW upgrade flowchart

5.7.3 Content and Usage of the One-Zip Software File

Below you find a content explanation of the One-Zip file, and instructions on how and when to use it.

- **Ambi_clustername_version.zip.** Not to be used by Service technicians.
- **Panel_clustername_version.zip.** Not to be used by Service technicians.
- **EDID_clustername_version.zip.** Contains the EDID content of the different EDID NVMs. See ComPair for further instructions.
- **FUS_clustername_version.zip.** Contains the “autorun.upg” which is needed to upgrade the TV main software and the software download application.
- **ProcessNVM_clustername_version.zip.** Default NVM content. Must be programmed via ComPair.

5.7.4 How to Copy NVM Data to/from USB

Write NVM data to USB

1. Insert the USB stick into the USB slot while in SAM mode.
2. Execute the command "Copy to USB", to copy the NVM data to the USB stick. The NVM filename on the USB stick will be named “**NVM2USB.bin**” (this takes a couple of seconds).

Write NVM data to TV

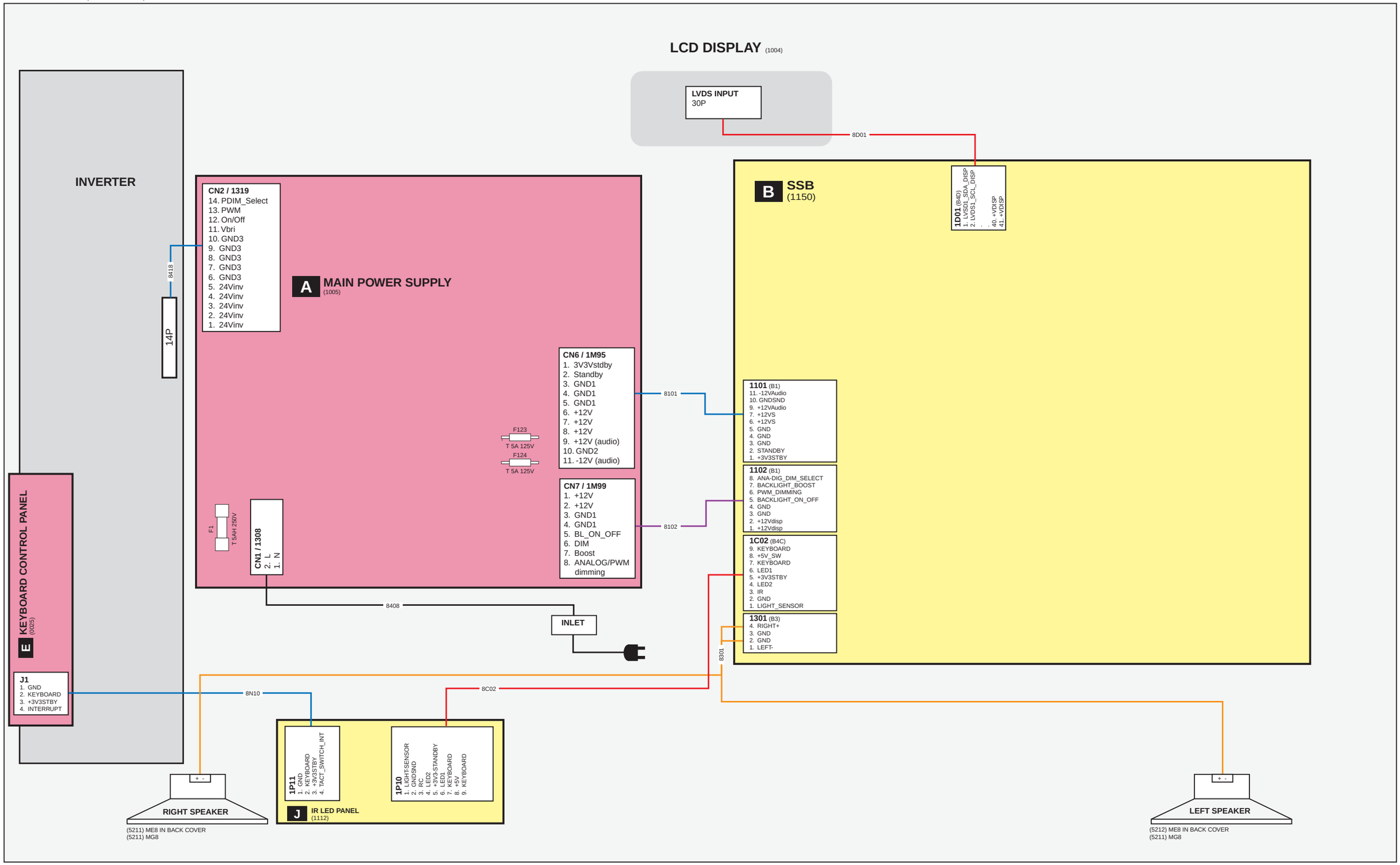
1. First, rename the filename (via a PC) on the USB stick to “**USB2NVM.bin**”.
2. Insert the USB stick into the USB slot while in SAM mode.
3. Execute the command "Copy from USB" to copy the USB data to NVM (this takes about a minute to complete).

Important: The file must be located in the **root directory** of the USB stick.

6. Block Diagrams, Test Point Overview, and Waveforms

Wiring Diagram 32" (ME8/MG8)

WIRING 32" (STYLING ME8/MG8)



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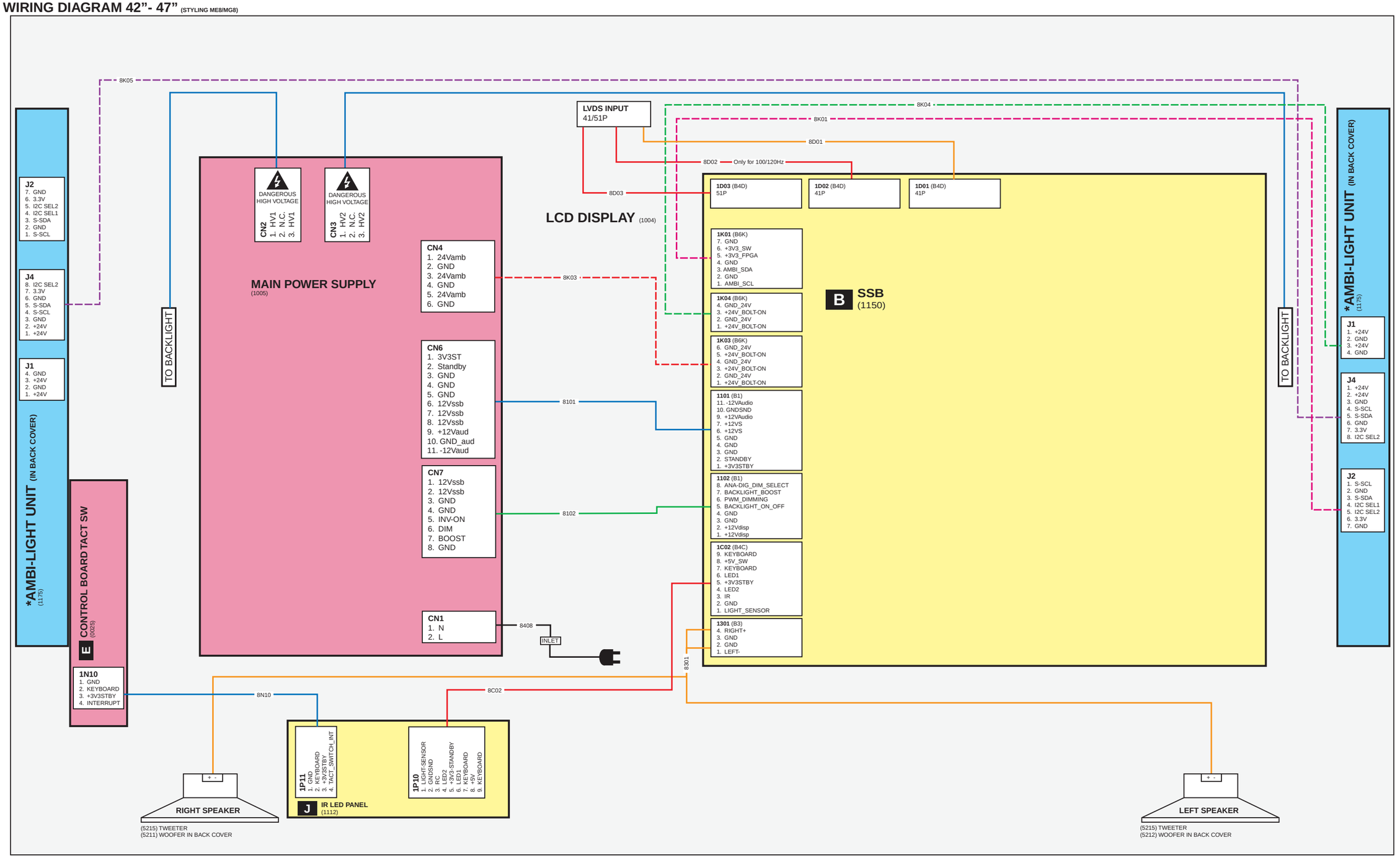
Wiring Diagram 42" & 47" (ME8/MG8)

WIRING DIAGRAM 42"- 47" (STYLING ME8/MG8)



* AMBI-LIGHT UNITS ARE OPTIONAL

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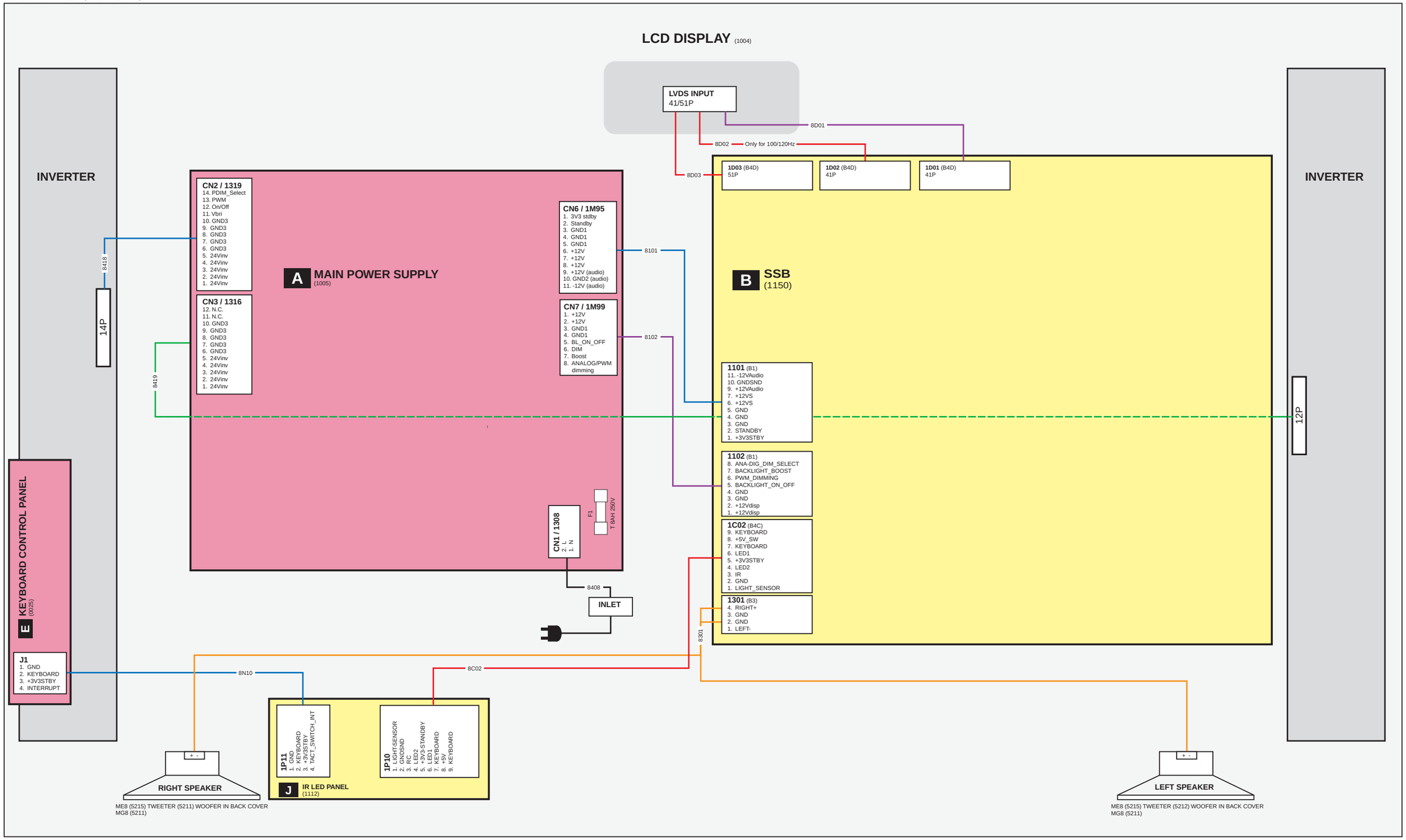
Wiring Diagram 52" (ME8/MG8)

WIRING 52" (STYLING ME8/MG8)



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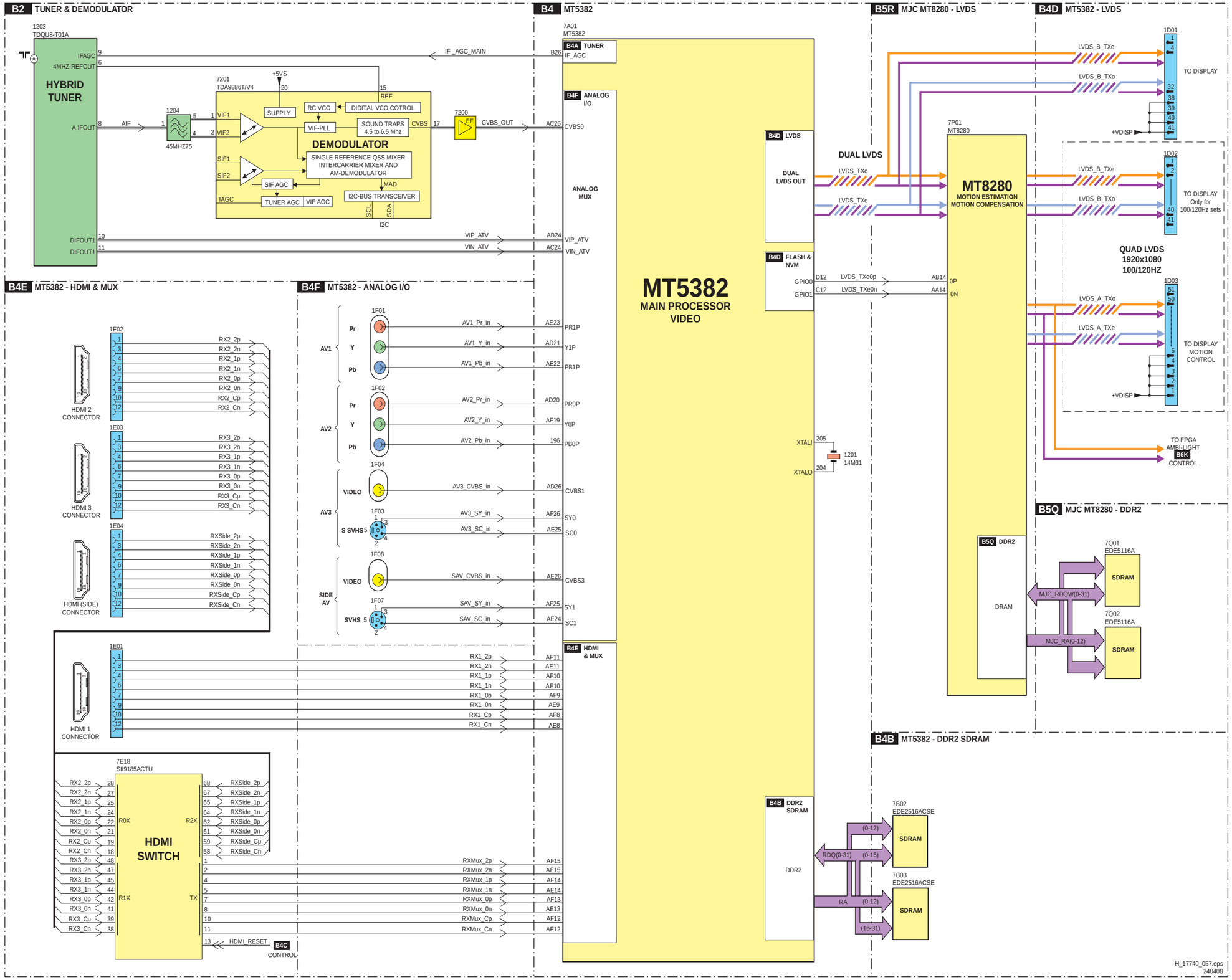
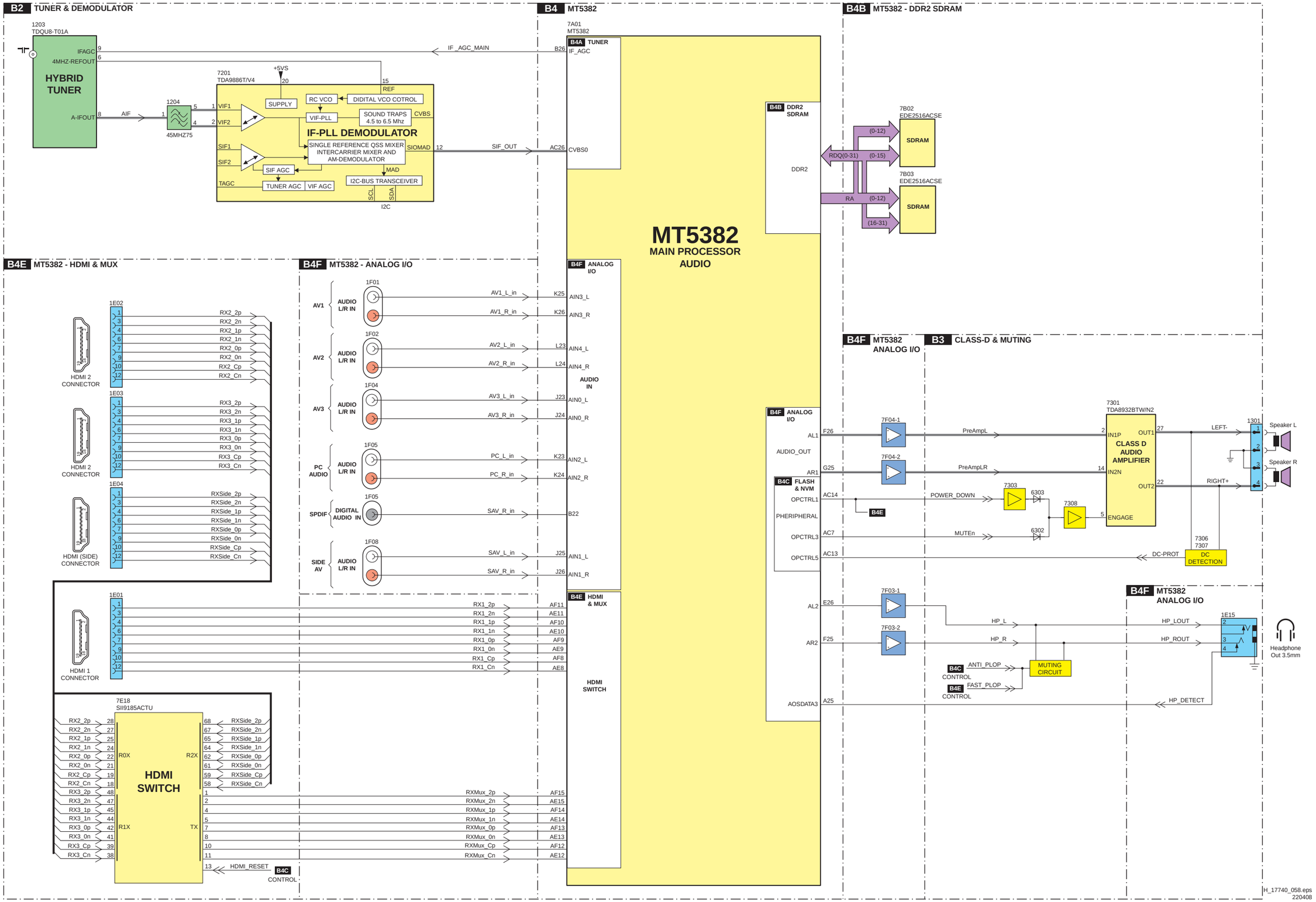
Block Diagram Video

VIDEO



Block Diagram Audio

AUDIO



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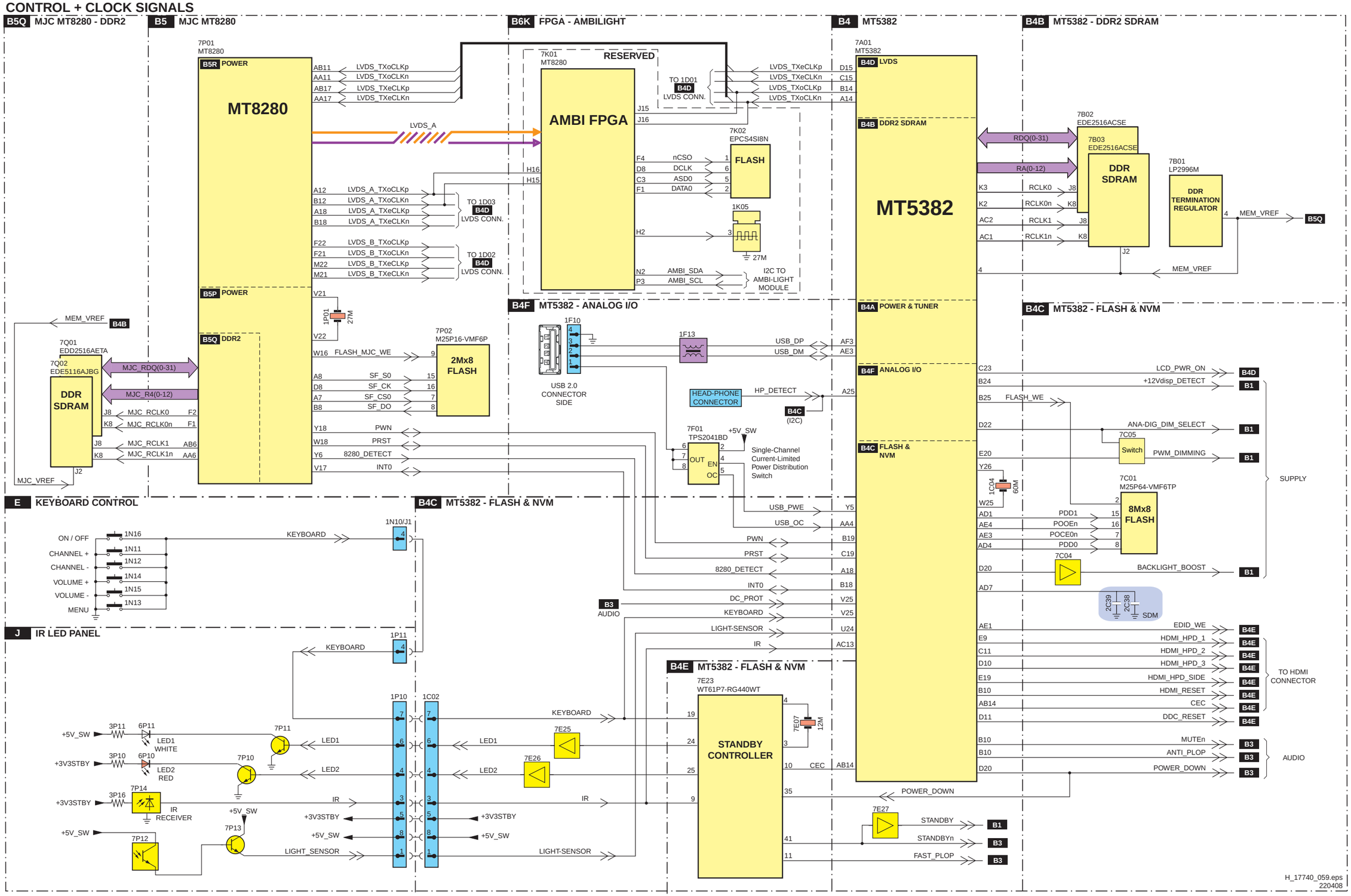
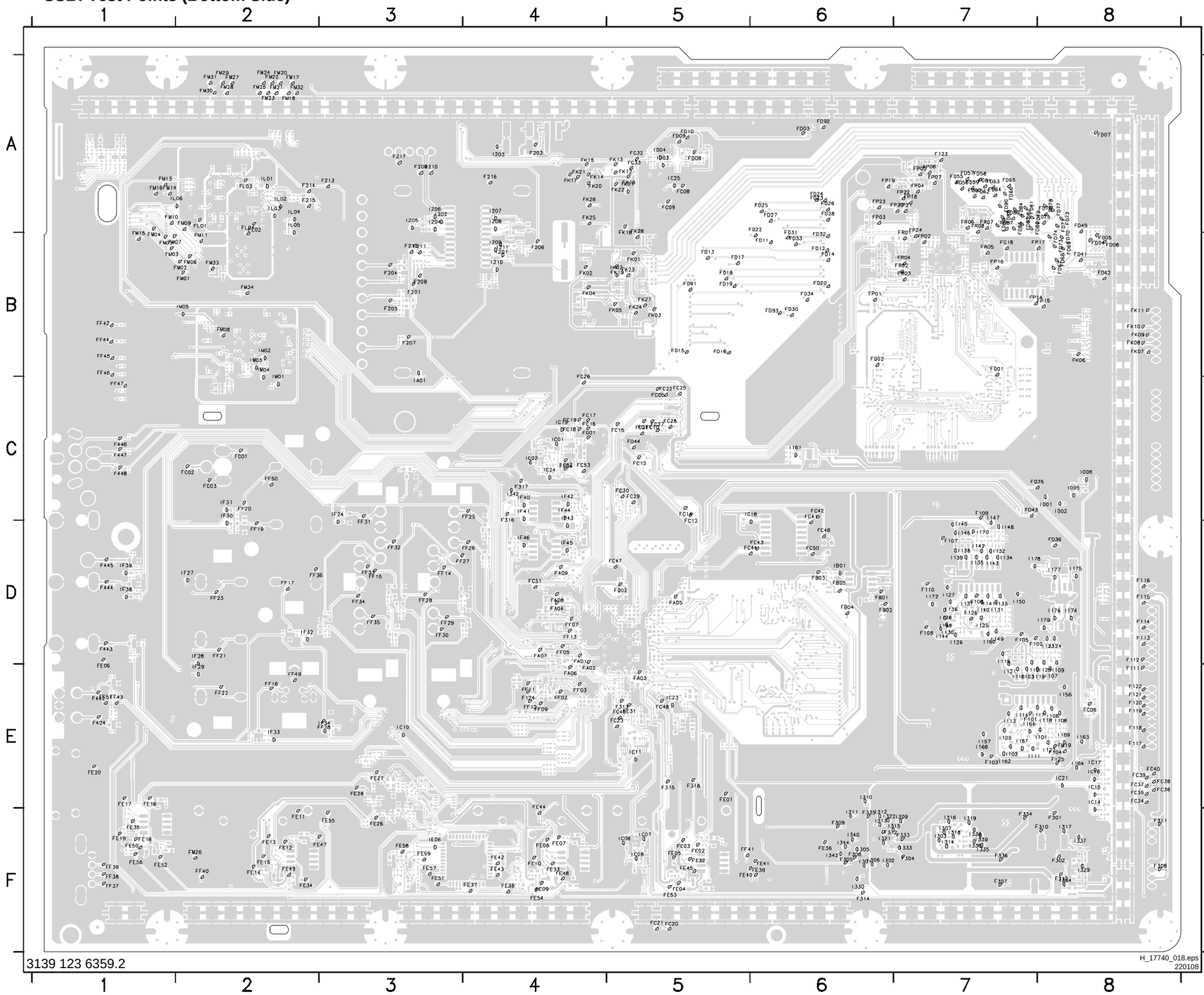
Block Diagram Control & Clock Signals

CONTROL + CLOCK SIGNALS

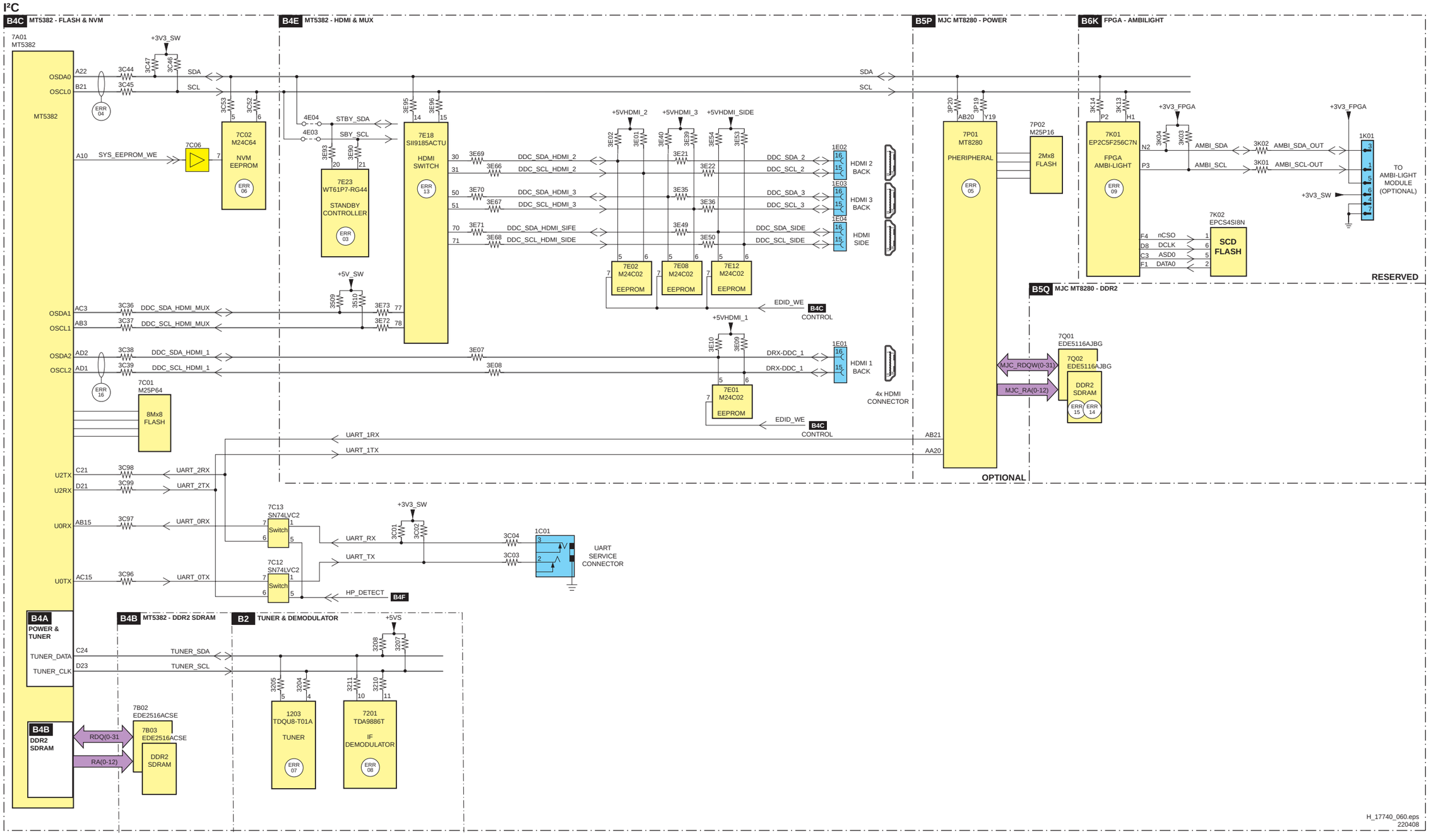


SSB: Test Points (Bottom Side)



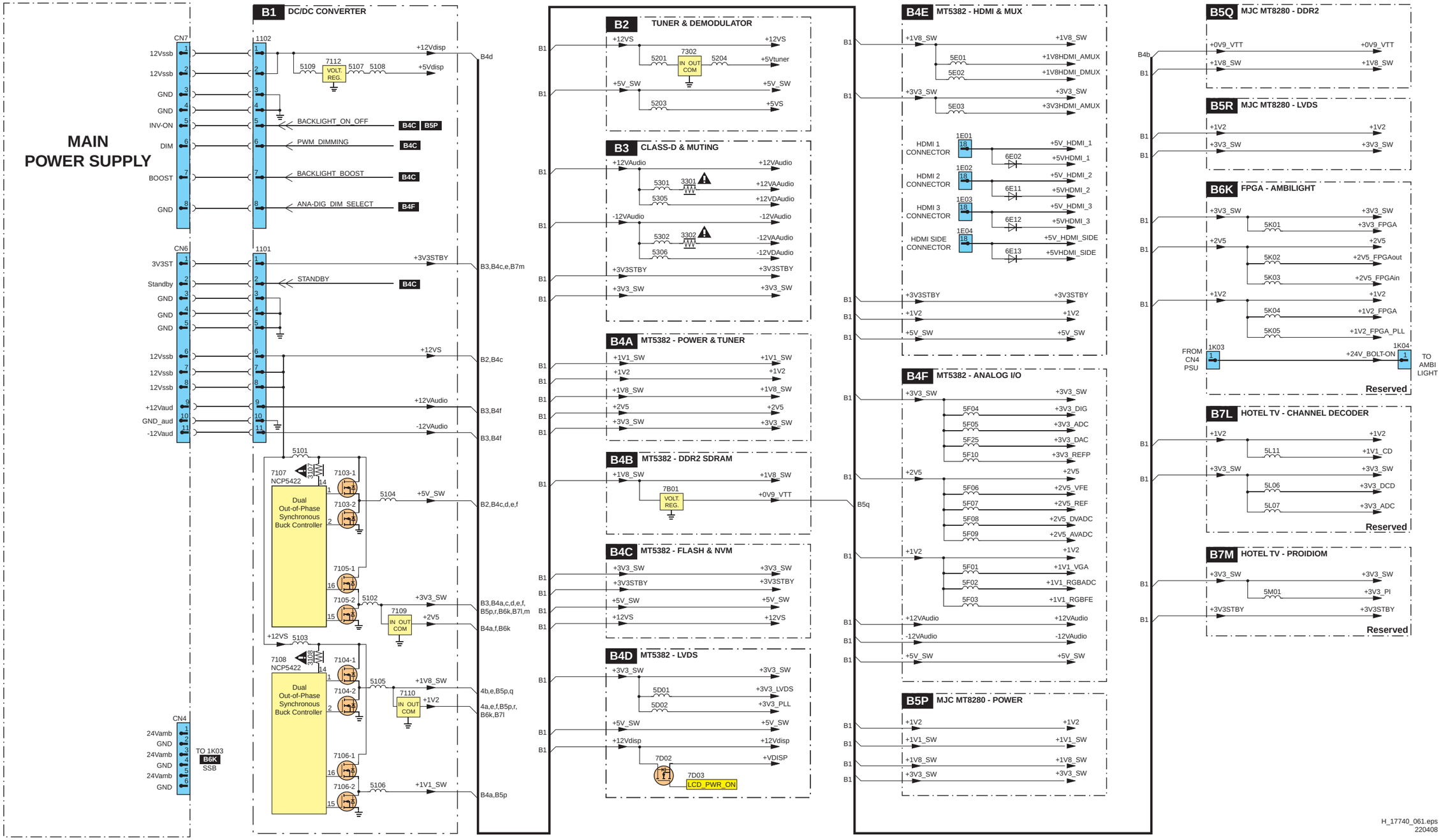
F101 E7 FC25 C5 FE03 F5 FK15 A4 I133 D7 IF27 D2
F102 D7 FC26 C4 FE04 F5 FK16 A5 I134 D7 IF28 D2
F103 E7 FC27 C5 FE05 F5 FK17 A4 I135 D7 IF29 E2
F104 E8 FC28 C5 FE06 D1 FK18 A5 I136 D7 IF30 D2
F105 D7 FC29 C5 FE07 F4 FK19 B5 I137 D7 IF31 C2
F106 D7 FC30 C5 FE08 F4 FK20 A4 I138 D7 IF32 D2
F107 D7 FC31 C5 FE09 F4 FK21 A4 I139 D7 IF33 E2
F108 D7 FC32 A5 FE10 F4 FK22 A5 I140 D7 IF34 E3
F109 C7 FC33 A5 FE11 F2 FK23 B5 I141 D7 IF38 D1
F110 D7 FC34 E8 FE12 F2 FK24 B5 I142 D7 IF39 D1
F111 E8 FC35 E8 FE13 F2 FK25 A4 I143 D7 IF40 C4
F112 D8 FC36 E8 FE14 F2 FK26 A4 I144 D7 IF41 C4
F113 D8 FC37 E8 FE15 F2 FK27 B5 I145 D7 IF42 C4
A F114 D8 FC38 E8 FE16 E1 FK28 B5 I146 D7 IF43 D4
F115 D8 FC39 E8 FE17 E1 FL01 A2 I147 D7 IF44 C4
F116 D8 FC40 E8 FE18 F1 FL02 A2 I148 D7 IF45 D4
F117 E8 FC41 D6 FE19 F1 FL03 A2 I149 D7 IF46 D4
F118 E8 FC42 C6 FE20 E1 FL04 B2 I150 D7 IK01 A5
F119 E8 FC43 D6 FE26 F3 FM01 B2 I156 E8 IK02 B5
F120 E8 FC44 D6 FE27 E3 FM02 B2 I157 E7 IL01 A2
F121 E8 FC46 D6 FE28 E3 FM03 B1 I158 D7 IL02 A2
F122 E8 FC47 D5 FE31 E5 FM04 A1 I160 D7 IL03 A2
F123 A7 FC48 E5 FE32 F5 FM05 B1 I161 C6 IL04 A2
F124 E4 FC49 E5 FE33 F4 FM06 B2 I162 E7 IL05 B2
F125 E8 FC50 D6 FE34 F2 FM07 B1 I163 E8 IL06 A2
F126 D7 FC51 D4 FE35 F1 FM08 B2 I164 E8 IM01 C2
F201 B3 FC52 C4 FE36 F6 FM09 A2 I166 E7 IM02 B2
F203 A4 FC53 C4 FE37 F4 FM10 A1 I167 E7 IM03 B2
F204 B3 FD01 C4 FE38 F4 FM11 B2 I168 E7 IM04 C2
F205 B3 FD02 D5 FE39 F6 FM13 A1 I169 E8 IM05 B2
F206 B4 FD03 A6 FE40 F6 FM14 A1 I170 D7
F207 B3 FD04 B8 FE41 F6 FM15 B1 I172 D7
F208 B3 FD05 B8 FE42 F4 FM16 A1 I174 D8
F209 A3 FD06 B8 FE43 F4 FM17 A2 I175 D8
F210 A3 FD07 A8 FE44 F4 FM18 A2 I176 D8
F211 B3 FD08 A5 FE45 F5 FM19 E8 I177 D8
F212 B3 FD09 A5 FE47 F3 FM20 A2 I178 D7
F213 A3 FD10 A5 FE48 F4 FM21 A2 I179 D8
F214 A2 FD11 B6 FE49 F2 FM22 A2 I201 B4
F215 A2 FD12 B6 FE50 F1 FM23 A2 I202 A3
F216 A4 FD13 B5 FE51 F3 FM24 A2 I203 A4
F217 A3 FD14 B6 FE52 F1 FM25 A2 I204 A3
F301 F8 FD15 B5 FE53 F5 FM26 F2 I205 A3
F302 F8 FD16 B5 FE54 F4 FM27 A2 I206 A3
F304 F7 FD17 B5 FE55 F3 FM28 A2 I207 A4
F305 F6 FD18 B5 FE56 F1 FM29 A2 I208 A4
F306 F6 FD19 B5 FE57 F3 FM30 A2 I209 B4
F307 F7 FD20 B6 FE58 F3 FM31 A2 I210 B4
F308 F8 FD22 B6 FE59 F3 FM32 A2 I211 B4
F309 F6 FD23 A6 FF02 E4 FM33 B2 I301 F6
F310 F8 FD24 A6 FF03 E4 FM34 B2 I302 F6
F311 F8 FD25 A6 FF05 D4 FP01 B6 I303 F7
F312 F6 FD26 A6 FF07 D4 FP02 B7 I304 F8
F313 E5 FD27 A6 FF09 E4 FP03 A6 I305 F6
F314 F6 FD28 A6 FF11 E4 FP04 A7 I306 F6
F315 E5 FD30 B6 FF12 E4 FP05 A7 I307 F7
F316 C4 FD31 B6 FF13 D4 FP06 A7 I309 F7
F317 C4 FD32 B6 FF14 D3 FP07 A7 I310 E6
F318 E5 FD33 B6 FF15 D3 FP14 B7 I311 F6
F332 F8 FD34 B6 FF16 E2 FP15 B8 I312 F6
F333 F7 FD35 C7 FF17 D2 FP16 B7 I313 F6
F334 F7 FD36 D8 FF18 E3 FP17 B8 I314 F7
F335 F6 FD41 B8 FF19 D2 FP18 A7 I315 F7
F336 F7 FD42 B8 FF20 C2 FP19 A6 I316 F7
F424 E1 FD43 C7 FF21 D2 FP20 A7 I317 F8
F442 E1 FD44 C5 FF22 E2 FP21 A7 I318 F7
F443 D1 FD45 A8 FF23 D2 FP22 A7 I319 F7
F444 D1 FD55 A7 FF25 C4 FP23 A6 I321 F6
F445 D1 FD56 A7 FF26 D4 FP24 B7 I322 F6
F446 C1 FD57 A7 FF27 D4 FQ01 B7 I329 F8
F447 C1 FD58 A7 FF28 D3 FQ02 B6 I330 F6
F448 C1 FD59 A7 FF29 D3 FR01 B7 I333 F7
FA01 D4 FD60 A7 FF30 D3 FR02 B7 I335 F7
FA02 D4 FD61 A7 FF31 C3 FR03 B7 I336 F7
FA03 E5 FD62 A7 FF32 D3 FR04 B7 I337 F8
FA04 D4 FD63 A7 FF33 D3 FR05 B7 I338 F7
FA05 D5 FD64 A7 FF34 D3 FR06 A7 I339 F7
FA06 E4 FD65 A7 FF35 D3 FR07 A7 I340 F6
FA07 D4 FD66 A7 FF36 D2 FR08 A7 I342 C4
FA08 D4 FD67 B8 FF37 F1 I101 E8 I343 F6
FA09 D4 FD68 B8 FF38 F1 I102 E7 I344 F6
FB01 D6 FD69 B8 FF39 F1 I103 E7 IA01 B3
FB02 D6 FD70 B8 FF40 F2 I105 E7 IB01 D6
FB03 D6 FD71 A8 FF41 F5 I106 E8 IC01 C4
FB04 D6 FD72 A8 FF42 B1 I107 E8 IC02 C4
FB05 D6 FD73 B8 FF43 E1 I108 E8 IC06 F5
FC01 C2 FD74 B8 FF44 B1 I109 D8 IC07 F5
FC02 C2 FD75 A8 FF45 B1 I110 D7 IC08 F5
FC03 C2 FD76 A8 FF46 B1 I111 E7 IC10 E3
FC04 C4 FD77 A8 FF47 C1 I113 E7 IC11 E5
FC05 C5 FD78 A8 FF49 E2 I114 E7 IC14 F8
FC06 E8 FD79 A7 FF50 C2 I115 D7 IC15 E8
FC08 A5 FD80 A7 FF51 E1 I116 E7 IC16 E8
FC09 A5 FD81 A7 FG18 B7 I117 E8 IC17 E8
FC10 C5 FD82 A7 FK01 B5 I118 E8 IC18 D6
FC11 C5 FD83 A7 FK02 B4 I119 E8 IC19 C4
FC12 C5 FD84 A7 FK03 B5 I120 D8 IC21 E8
FC13 C5 FD85 A7 FK04 B4 I121 D7 IC23 E5
FC14 C5 FD86 A7 FK05 B5 I122 E8 IC24 C4
FC15 C5 FD87 A7 FK06 B8 I123 D8 IC25 A5
FC16 C4 FD88 A7 FK07 B8 I124 D8 ID01 C8
FC17 C4 FD89 A7 FK08 B8 I125 D7 ID02 C8
FC18 C4 FD90 A7 FK09 B8 I126 D7 ID03 A5
FC19 C4 FD91 B5 FK10 B8 I127 D7 ID04 A5
FC20 F5 FD92 A6 FK11 B8 I128 D7 ID05 C8
FC21 F5 FD93 B6 FK12 A5 I130 D7 ID06 C8
FC22 C5 FE01 E5 FK13 A5 I131 D7 IE06 F3
FC23 E5 FE02 F5 FK14 A4 I132 D7 IF24 D3

I2C IC Overview



Supply Lines Overview

SUPPLY LINES OVERVIEW



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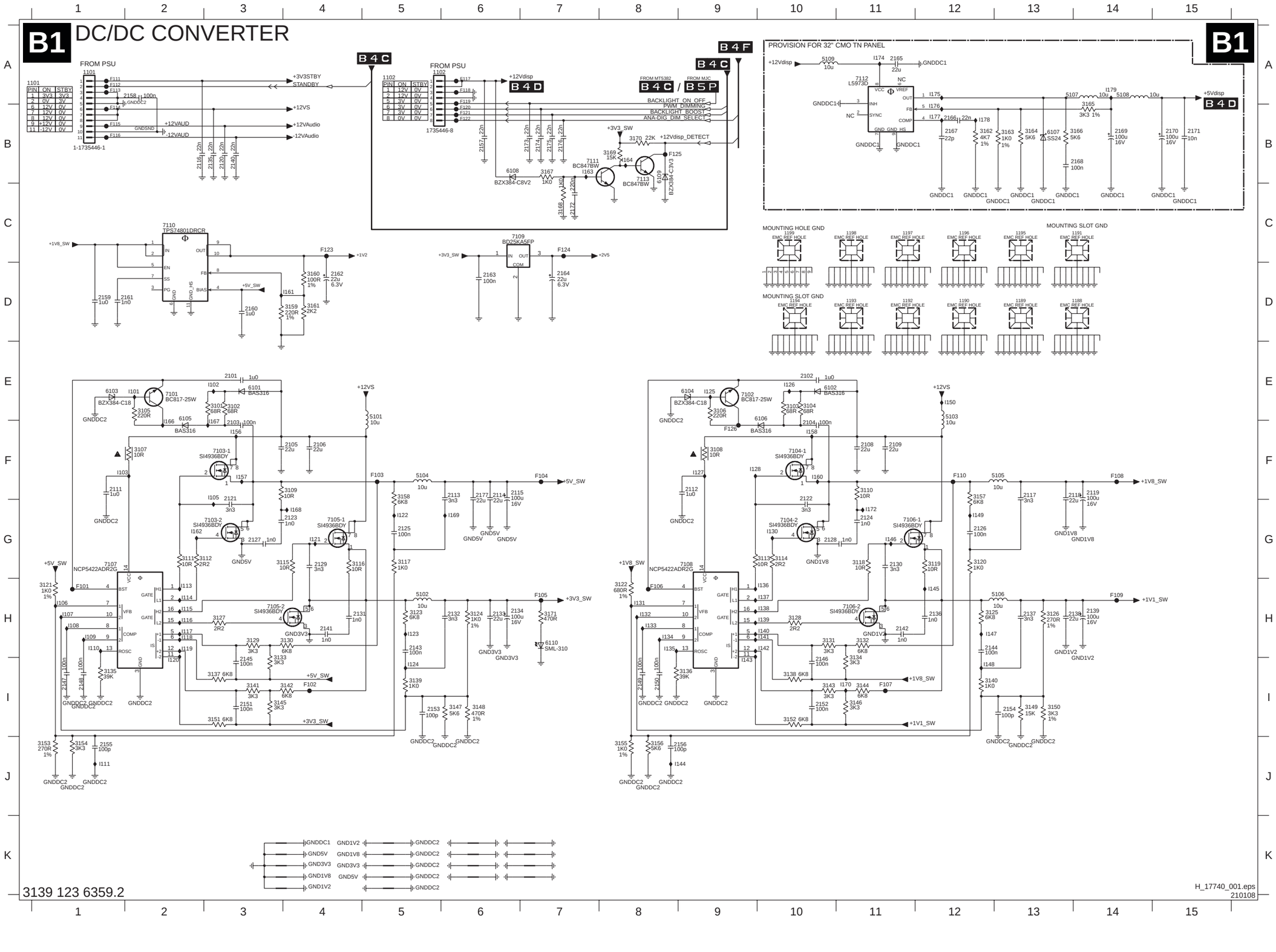
7. Circuit Diagrams and PWB Layouts

SSB: DC / DC Converter



SSB: Tuner & Demodulator

B2 TUNER & DEMODULATOR

B2

TUNER TDQU8 1203

RF IN, F216, 14, 15, MT, DC, EXT-RFAGC, AS, SCL, SDA, 4MHZ-REFOUT, +B(5V), A-IFOUT, IFAGC, DIFOUT1, DIFOUT2, MT, 13, 12

NC 1, 2, NC 3, 4

** PROVISION FOR EXTERNAL RF-AGC

TUNER_RF_AGC, 2228 100n, 2229 10u, +5VS, 3217 10K, 3222 47K

3200 2200 330R 1n5

2202 22p RES, 2235 100p, 4M0 RES 1202, 1n0 2208

I211, I210, I209

7201 TDA9886T/V4

TOP, TAGC, VAGC, VPLL, REF, AFC

TUNER AGC | VIF AGC | RC VCO | DIGITAL VCO CONTROL | AFC DETECTOR

4207, 4209 RES, F207, TUNER_RF_AGC, AIF

1204 OFWM1971M 45M75: I, IGND, GND, O1, O2

F217, F209, F210, 560n 5202

VIF2, VIF1, SIF2, SIF1

VIF-PLL

SINGLE REFERENCE QSS MIXER INTERCARRIER MIXER AND AM-DEMODULATOR

SOUND TRAPS 4.5 to 6.5 Mhz

AUDIO PROCESSING AND SWITCHES

NARROW-BAND FM-PLL DEMODULATOR

MAD

SUPPLY | SIF AGC | OUTPUT PORTS | I²C-BUS TRANSCEIVER

CVBS 17 I201, AUD 8 NC, DEEM 5 2209 10n, AFD 6 I204 2218 470n

+5VS, 2204 100n, 7200 BC847BW

3203 220R F206 CVBS_OUT

220R 47n 3205 2240 Gnd_CVBS_OUT

TO ANALOG-IOs B4F

Vp, AGND, NC, OP1, OP2, SCL, SDA, DGND, SIOMAD, FMPLL

5209 30R I208 F201, 10n 2226

I206 1n0 2205, I207 10n 2227

RES 100R 3210, 100R RES 3211, 2221, 2222

100n 2223, 47R 3212, 2230 47p, 3220 0R, 3221 0R, F208

I202, 10n 390p 2224 2225, I205 5K6 3213

3223 47R, 3224 47R, I203, 7202 L78M05CDT (IN, OUT, COM)

F203 5201 30R +12VS, 1u0 2216, 100n 2217, 4208 RES, 5204 30R F204 +5Vtuner, 100n 2220

+5V_SW, 5203 10u, F205 +5VS, 10u 2219

10n RES, 22p RES, 100R 3204, 100R 3205, 22p RES 2213, 100n RES 2231, 10n 2214, 4K7 3209, 10n 2215, 1n0 2238, 1n0 2239, 220R 3226, 220R 3227, 33p 2236, 33p 2237, 390n 5207, 390n 5208, 4K7 3207, 4K7 3208, 30R 5205, 30R 5206, +5VS, +5Vtuner, IF_AGC

4201 4202 4203 4204 4205 4206, F211 F212 F213 F214 F215

*	MFD	BDS
4201	Y	--
4202	--	Y
4203	--	Y
4204	--	Y
4205	Y	--
4206	Y	--

TUNER_SCL, TUNER_SDA, IF_AGC_MAIN, IF_AGC_SIDEdec, FATIN-, FATIN+, VIP_ATV, VIN_ATV, SIF_OUT, SIF_OUT_GND

TO POWER/TUNER B4A

B7L TO CHANNEL DECODER

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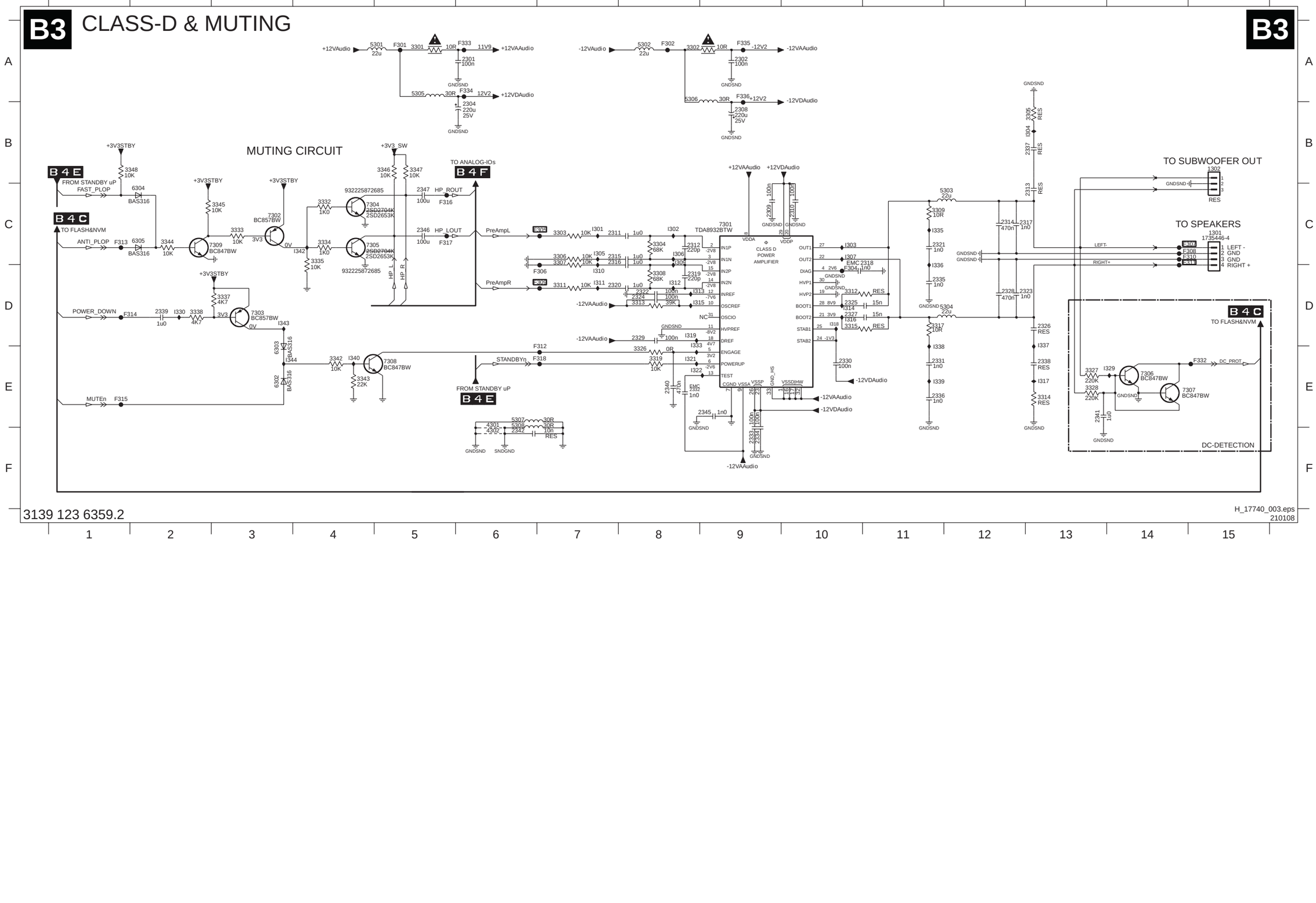
1202 B6 F207 C3
1203 A1 F208 F7
1204 C3 F209 C4
2200 A5 F210 C4
2201 B5 F211 E1
2202 B7 F212 E2
2203 B5 F213 E2
2204 B10 F214 E2
2205 E6 F215 E2
2208 B8 F216 B1
2209 C9 F217 C3
2211 D1 I201 C9
2212 D1 I202 D8
2213 D2 I203 E9
2214 D2 I204 D9
2215 D2 I205 E8
2216 F9 I206 D6
2217 F10 I207 D6
2218 D9 I208 D4
2219 G11 I209 B5
2220 F11 I210 B5
2221 E6 I211 B7
2222 E7
2223 E7
2224 E8
2225 E8
2226 E4
2227 E6
2228 A5
2229 A5
2230 E7
2231 D2
2233 B5
2235 A7
2236 D2
2237 D2
2238 C2
2239 C2
2240 C11
3200 A5
3203 C10
3204 D2
3205 D2
3206 C10
3207 D1
3208 D2
3209 D2
3210 E7
3211 E7
3212 E7
3213 E8
3216 B5
3217 A4
3220 F7
3221 F7
3222 A5
3223 E9
3224 E9
3226 D2
3227 D2
4201 E2
4202 E2
4203 E2
4204 E2
4205 E3
4206 E3
4207 C2
4208 F10
4209 C2
5201 E9
5202 C3
5203 F10
5204 E10
5205 E2
5206 E2
5207 E2
5208 E2
5209 D4
7200 C10
7201 B4
7202 E9
F201 D5
F203 E9
F204 E10
F205 F10
F206 C10

SSB: Class-D & Muting



SSB: MT5382-Power & Tuner

B4A MT5382 - POWER & TUNER

B4A

7A01-1
MT5382
POWER

+1V1_SW 5A01 30R FA03 A3
+1V1_SW 5A08 30R A4
+1V1_SW 5A09 30R B4
B5
C5
2A01 4u7 C6
2A02 1u0 D6
2A03 1u0 C7
2A04 1u0 K11
2A05 100n M11
2A06 100n R11
2A07 100n U11
2A08 100n L12
2A09 100n N12
2A10 100n P12
T12
K13
U13
L14
T14
L15
T15
K16
U16
L17
N17
P17
T17
K18
M18
R18
U18

FA04
+3V3_SW 5A02 30R AB4
2A11 4u7 AA5
2A12 1u0 F23
2A13 100n D24
2A14 100n E24
2A15 100n F10
2A16 100n F11

FA05
+1V8_SW H1
W1
2A17 4u7 A2
2A18 4u7 B2
2A19 1u0 B3
2A20 100n C3
2A21 100n C4
2A22 100n D4
2A23 100n M4
2A24 100n V4
2A25 100n D5
E5
H5
J5
N5
U5
E6
F6

VCCK1 VCCK2 VCCK3 VCCK4 VCCK5 VCCK6 VCCK7 VCCK8 VCCK9 VCCK10 VCCK11 VCCK12 VCCK13 VCCK14 VCCK15 VCCK16 VCCK17 VCCK18 VCCK19 VCCK20 VCCK21 VCCK22 VCCK23 VCCK24 VCCK25 VCCK26 VCCK27 VCCK28 VCCK29 VCCK30 VCCK31 VCCK32
VCC3IO_1_1 VCC3IO_1_2 VCC3IO_2_1 VCC3IO_2_2 VCC3IO_2_3 VCC3IO_3_1 VCC3IO_3_2
VCC2IO1 VCC2IO2 VCC2IO3 VCC2IO4 VCC2IO5 VCC2IO6 VCC2IO7 VCC2IO8 VCC2IO9 VCC2IO10 VCC2IO11 VCC2IO12 VCC2IO13 VCC2IO14 VCC2IO15 VCC2IO16 VCC2IO17 VCC2IO18

DVSS_GND1 DVSS_GND2 DVSS_GND3 DVSS_GND4 DVSS_GND5 DVSS_GND6 DVSS_GND7 DVSS_GND8 DVSS_GND9 DVSS_GND10 DVSS_GND11 DVSS_GND12 DVSS_GND13 DVSS_GND14 DVSS_GND15 DVSS_GND16 DVSS_GND17 DVSS_GND18 DVSS_GND19 DVSS_GND20 DVSS_GND21 DVSS_GND22 DVSS_GND23 DVSS_GND24 DVSS_GND25 DVSS_GND26 DVSS_GND27 DVSS_GND28 DVSS_GND29 DVSS_GND30 DVSS_GND31 DVSS_GND32 DVSS_GND33 DVSS_GND34 DVSS_GND35 DVSS_GND36 DVSS_GND37 DVSS_GND38 DVSS_GND39 DVSS_GND40 DVSS_GND41 DVSS_GND42 DVSS_GND43 DVSS_GND44 DVSS_GND45 DVSS_GND46 DVSS_GND47 DVSS_GND48 DVSS_GND49 DVSS_GND50 DVSS_GND51 DVSS_GND52 DVSS_GND53 DVSS_GND54
E1 AB1 T4 Y4 F5 L5 R5 W5 H6 K6 L11 N11 P11 T11 K12 M12 R12 U12 L13 M13 P13 N13 R13 T13 K14 M14 N14 P14 U14 K15 N15 P15 R15 U15 L16 M16 N16 P16 R16 T16 K17 M17 R17 U17 L18 N18 P18 T18 E21 E22 E25 D26

B4F

2A26 100p RES
3A01 5K1 1%
2A36 1n0 RES
2A37 1n0 RES
USB_DM
USB_DP
+3V3_SW
5A04 30R
2A27 1u0
2A28 100n
+1V2
5A05 30R
2A29 4u7
2A30 100n

7A01-3
MT5382
ANALOG

AF2 AE3 AF3 AB5 AD3 AC4 AD4
USB_VRT USB_DM USB_DP AVDD33_USB AVSS33_USB AVDD12_USB AVSS12_USB
AVDD12_ADCPLL AVDD12_PSCANPLL AVDD12_DTDPLL AVDD12_HDMIPLL AVDD12_APLL AVDD12_SYSPLL AVDD12_TVDPLL AVDD12_DMPLL
AVSS_PLL1 AVSS_PLL2 AVSS_PLL3
R25 T26 T24 U26 P24 R26 T25 R24 P22 R22 T22
TN0 TP0 R23 T23
FA01 (PLL)
FA02 (PLL)

FA06 5A06 30R +1V2
2A33 4u7
2A34 100n
2A35 10n

B4F

B2

B7M
FROM PROIDIOM

7A01-6
MT5382
TUNER

SIF_OUT 2A31 10n
SIF_OUT_GND 2A32 10n
P25 P26 N26 N25 N24
SIFP|MPX0P SIFN|MPX0N AF|MPX1 AVDD25_SADC AVSS25_SADC
NC

FA07 5A07 30R +2V5
2A38 4u7
2A39 100n

TUNER_SDA 4A01
TUNER_SCL 4A02
TS_DATA(3)
TS_DATA(2)
TS_DATA(1)
C24 D23 E23 C25 C26
TUNER_DATA TUNER_CLK ATN_DET ATN_RX ATN_TX
A26 B26
RF_AGC IF_AGC
FA09
FA08 3A02 10K IA01 IF_AGC_MAIN
47n
2A40

TS_VALID 3 6 RES
TS_CLK 4 5
TS_DATA(0) 4A03-1 1 8
TS_SOP 4A03-2 2 7

*	MFD	BDS
4A01	Y	--
4A02	Y	--
4A03	--	Y

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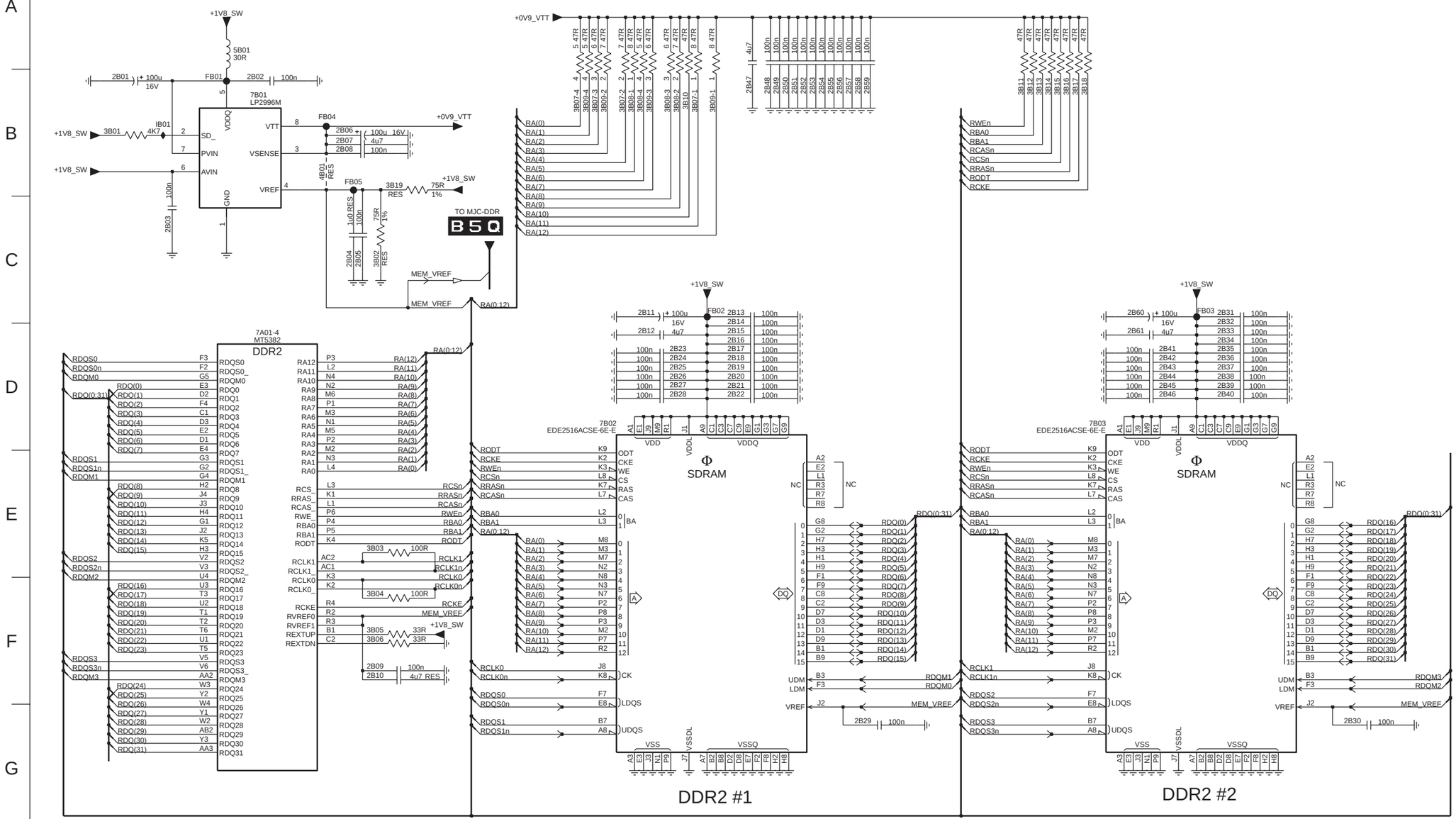
2A01 B1
2A02 B1
2A03 B1
2A04 B1
2A05 B1
2A06 B1
2A07 B1
2A08 B1
2A09 B1
2A10 B1
2A11 D1
2A12 D1
2A13 D1
2A14 D1
2A15 D1
2A16 D1
2A17 D1
2A18 D1
2A19 D1
2A20 D1
2A21 E1
2A22 E1
2A23 E1
2A24 E1
2A25 E1
2A26 A4
2A27 B4
2A28 B4
2A29 B4
2A30 B4
2A31 D4
2A32 D4
2A33 B7
2A34 B7
2A35 B7
2A36 A4
2A37 B4
2A38 D7
2A39 D7
2A40 D8
3A01 A4
3A02 D7
4A01 D4
4A02 D4
4A03-1 D4
4A03-2 E4
5A01 A1
5A02 D1
5A04 B4
5A05 B4
5A06 B7
5A07 D7
5A08 A1
5A09 A1
7A01-1 A2
7A01-3 A6
7A01-6 C6
FA01 B7
FA02 B7
FA03 A1
FA04 C1
FA05 D1
FA06 A7
FA07 D7
FA08 D7
FA09 D7
IA01 D8

SSB: MT5382-DDR2 SDRAM

B4B MT5382 - DDR2 SDRAM



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2B01 B1	3B17 B9
2B02 B2	3B18 B9
2B03 C1	3B19 B3
2B04 C3	4B01 B3
2B05 C3	5B01 A2
2B06 B3	7A01-4 D2
2B07 B3	7B01 B2
2B08 B3	7B02 D5
2B09 F3	7B03 D9
2B10 F3	FB01 B2
2B11 C5	FB02 C6
2B12 D5	FB03 C10
2B13 C6	FB04 B3
2B14 D6	FB05 B3
2B15 D6	IB01 B1
2B16 D6	
2B17 D6	
2B18 D6	
2B19 D6	
2B20 D6	
2B21 D6	
2B22 D6	
2B23 D5	
2B24 D5	
2B25 D5	
2B26 D5	
2B27 D5	
2B28 D5	
2B29 G7	
2B30 G11	
2B31 C10	
2B32 D10	
2B33 D10	
2B34 D10	
2B35 D10	
2B36 D10	
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2B39 D10	
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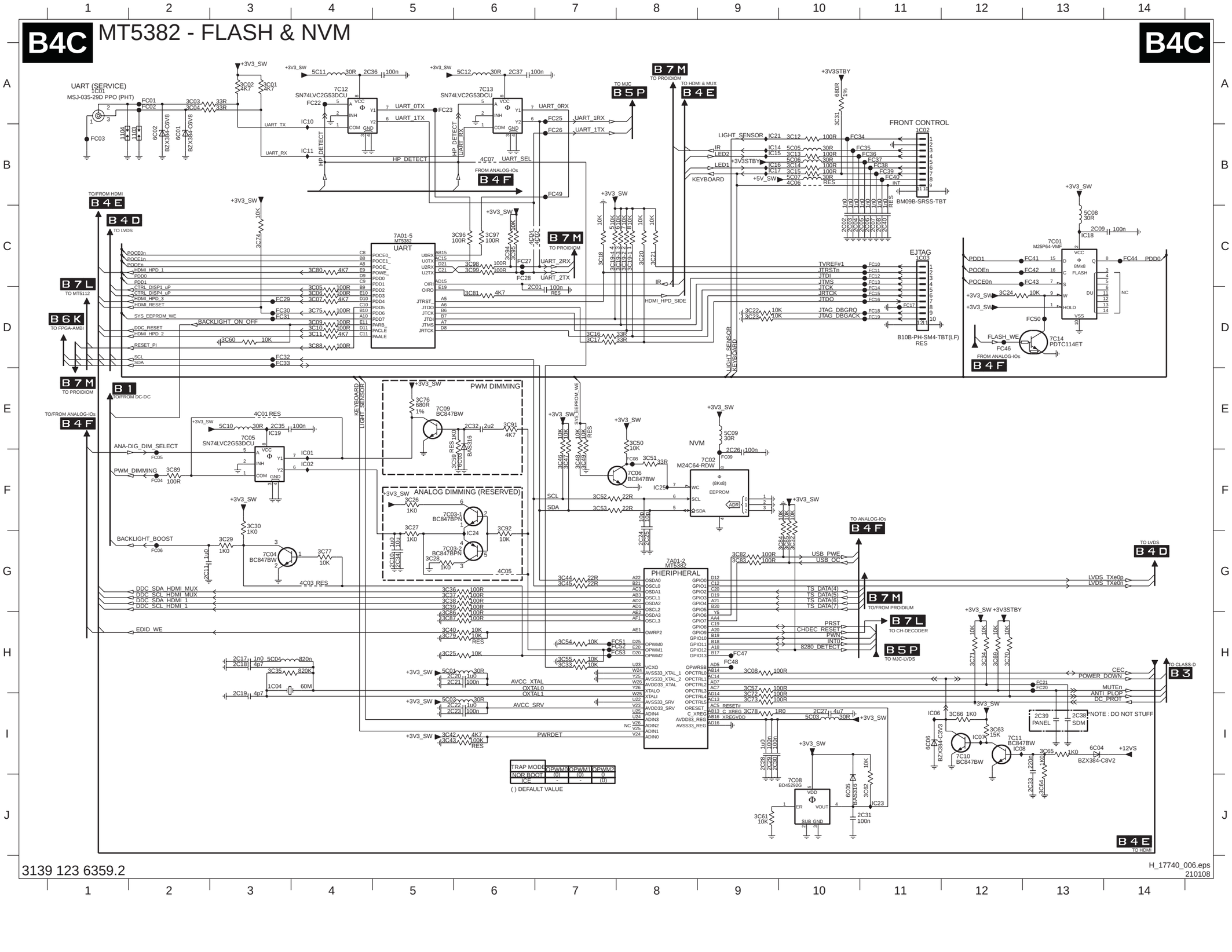
2B43 D9	
2B44 D9	
2B45 D9	
2B46 D9	
2B47 B6	
2B48 B6	
2B49 B6	
2B50 B6	
2B51 B6	
2B52 B6	
2B53 B6	
2B54 B7	
2B55 B7	
2B56 B7	
2B57 B7	
2B58 B7	
2B59 B7	
2B60 C9	
2B61 D9	
3B01 B1	
3B02 C3	
3B03 E3	
3B04 F3	
3B05 F3	
3B06 F3	
3B07-1 B6	
3B07-2 B5	
3B07-3 B5	
3B07-4 B5	
3B08-1 B5	
3B08-2 B5	
3B08-3 B5	
3B08-4 B5	
3B09-1 B6	
3B09-2 B5	
3B09-3 B5	
3B09-4 B5	
3B10 B5	
3B11 B8	
3B12 B8	
3B13 B8	
3B14 B8	
3B15 B8	
3B16 B8	

SSB: MT5382-Flash & NVM

B4C MT5382 - FLASH & NVM



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1103	B2	3C87	H5
1104	B1	3C88	D4
1C01	A1	3C89	F2
1C02	B11	3C91	E6
1C03	C11	3C92	F6
1C04	H3	3C94	C6
2C01	D6	3C95	C6
2C02	C10	3C96	C6
2C03	C10	3C97	C6
2C04	C10	3C98	C6
2C05	C11	3C99	C6
2C06	C11	4C01	E3
2C07	C11	4C02	C7
2C08	C11	4C03	G4
2C09	C13	4C04	C6
2C10	G5	4C05	G6
2C11	G2	4C06	B10
2C17	H3	4C07	B6
2C18	H3	5C01	H5
2C19	I3	5C02	I5
2C20	H6	5C03	I10
2C21	H6	5C04	H3
2C22	I6	5C05	B10
2C23	I6	5C06	B10
2C24	G8	5C07	B10
2C25	G8	5C08	C13
2C26	F9	5C09	E9
2C27	I10	5C10	E3
2C28	I9	5C11	A4
2C29	I9	5C12	A6
2C30	I9	6C01	B2
2C31	J11	6C02	B2
2C32	E6	6C03	F6
2C33	J13	6C04	I13
2C34	G5	6C05	J10
2C35	E3	6C06	I11
2C36	A4	7A01-2	G8
2C37	A6	7A01-5	C5
2C38	I13	7C01	C13
2C39	I13	7C02	F9
2C40	C11	7C03-1	F6
3C01	A3	7C03-2	G6
3C02	A3	7C04	G3
3C03	A2	7C05	E3
3C04	A2	7C06	F8
3C05	D4	7C08	J10
3C06	D4	7C09	E5
3C07	D4	7C10	I12
3C08	H9	7C11	I12
3C09	D4	7C12	A4
3C10	D4	7C13	A6
3C11	D4	7C14	D13
3C12	B10	FC01	A2
3C13	B10	FC02	A2
3C14	B10	FC03	B1
3C15	B10	FC04	F2
3C16	D7	FC05	F2
3C17	D7	FC06	G2
3C18	C7	FC08	F8
3C19-1	C8	FC09	F9
3C19-2	C8	FC10	C11
3C19-3	C8	FC11	C11
3C19-4	C7	FC12	C11
3C20	C8	FC13	C11
3C21	C8	FC14	D11
3C22	D9	FC15	D11
3C23	D9	FC16	D11
3C24	D12	FC17	D11
3C25	H5	FC18	D11
3C26	F5	FC19	D11
3C27	F5	FC20	H13
3C28	G5	FC21	H13
3C29	G3	FC22	A4
3C30	F3	FC23	A5
3C31	A10	FC25	A7
3C32	G10	FC26	B7
3C33	H7	FC27	C6
3C34	H12	FC28	C6
3C35	H3	FC29	D3
3C36	G5	FC30	D3
3C37	G5	FC31	D3
3C38	G5	FC32	D3
3C39	G5	FC33	D3
3C40	H5	FC34	B10
3C42	I5	FC35	B11
3C43	I5	FC36	B11
3C44	G7	FC37	B11
3C45	G7	FC38	B11
3C46	F7	FC39	B11
3C47	F7	FC40	B11
3C48	F7	FC41	C13
3C49	F7	FC42	C13
3C50	E8	FC43	C13
3C51	F8	FC44	C14
3C52	F7	FC46	D12
3C53	F7	FC47	H9
3C54	H7	FC48	H9
3C55	H7	FC49	B7
3C57	H9	FC50	D13
3C59	F5	FC51	H8
3C60	D3	FC52	H8
3C61	J9	FC53	H8
3C62	J11	IC01	F4
3C63	I12	IC02	F4
3C64	J13	IC06	I11
3C65	I13	IC07	I12
3C66	I12	IC08	I12
3C69	H12	IC10	A4
3C70	H12	IC11	B4
3C71	H12	IC14	B9
3C72	I9	IC15	B9
3C73	I9	IC16	B9
3C74	C3	IC17	B9
3C75	D4	IC18	C13
3C76	E5	IC19	E3
3C77	G4	IC21	B9
3C78	I9	IC23	J11
3C79	H5	IC24	G6
3C80	C4	IC25	F8
3C81	D6		
3C82	G9		
3C83	G9		
3C84	G10		
3C85	G10		
3C86	H5		

SSB: MT5382-LVDS

B4D MT5382 - LVDS

B4D

B5R & B6K TO MJC-LVDS / TO FPGA-AMBI

B5R TO MJC-LVDS

B4C

** PROVISION FOR I2C BUFFER

RESERVED FOR DISPLAY I2C CONTROL

7A01-8 MT5382 LVDS

LVDS#1 1D01

LVDS#2 1D02

LVDS#2 1D03

B5R FROM MJC-LVDS

B5R & B6K FROM MJC-LVDS / TO FPGA-AMBI

B4C FROM LVDS

B4C FROM FLASH

B5P / B4F

B4E FROM STANDBY uP

RESERVED FOR PDP

LCD ONLY

FOR LCD		
LVDS_SEL	0	NS
	1	JEIDA
BIT_SELECT	0	8bit
	1	10bit / 8bit + FRC

	FD65 D14
1D01 D9	FD66 D14
1D02 B15	FD67 G14
1D03 F15	FD68 G14
1D04 D5	FD69 G14
1D05 E5	FD70 H14
1D06 E5	FD71 H14
1D07 E5	FD72 H14
1D08 F5	FD73 H14
1D09 F5	FD74 H14
1D10 G5	FD75 H14
1D11 G5	FD76 H14
1D12 H5	FD77 H14
1D13 H5	FD78 H14
1D38 C5	FD79 H14
1D39 D5	FD80 I14
2D02 A2	FD81 I14
2D03 A2	FD82 I14
2D04 A2	FD83 I14
2D05 A2	FD84 I14
2D06 B2	FD85 I14
2D07 B2	FD86 I14
2D09 A8	FD87 I14
2D10 C6	FD88 I14
2D11 C6	FD89 I14
2D14 I2	FD90 I14
2D15 H9	FD91 E5
2D16 H9	FD92 J14
2D17 K7	FD93 G5
2D18 K7	ID01 J2
2D19 K7	ID02 I2
2D20 K7	ID03 B7
2D21 D8	ID04 B7
2D22 D8	ID05 I2
2D23 F13	ID06 H3
2D24 F13	
2D27 J14	
2D28 J14	
3D05 G13	
3D06 G13	
3D37 D8	
3D38 D8	
3D39 B6	
3D40 B6	
3D41 B8	
3D42 B8	
3D45 I2	
3D46 I1	
3D47 J7	
3D48 J7	
3D49 J7	
3D50 J7	
3D51-1 J6	
3D51-2 J6	
3D51-3 J6	
3D51-4 J6	
3D55 J2	
3D56 I4	
3D57 J8	
3D58 K6	
3D59 K8	
3D60 K8	
4D01 J9	
4D02 C8	
4D03 C8	
4D04 H1	
4D05 H2	
4D06 H2	
4D07 H2	
4D08 H2	
4D09 H1	
4D10 H1	
4D11 H2	
4D12 H2	
5D01 A1	
5D02 B1	
5D03 A7	
5D04 A7	
5D05 H3	
5D06 I3	
5D07 I3	
6D01 D8	
6D02 D8	
6D03 I2	
6D04 I4	
6D07 F13	
6D08 F13	
7A01-8 C2	
7D01 B7	
7D02 I3	
7D03 J2	
FD01 A3	
FD02 B3	
FD03 G9	
FD04 G9	
FD05 G9	
FD06 G9	
FD07 G9	
FD08 A8	
FD09 D8	
FD10 D8	
FD11 C5	
FD12 C5	
FD13 D5	
FD14 D5	
FD15 D5	
FD16 D5	
FD17 D5	
FD18 E5	
FD19 E5	
FD20 E5	
FD22 F5	
FD23 F5	
FD24 F5	
FD25 F5	
FD26 G5	
FD27 G5	
FD28 G5	
FD30 G5	
FD31 H5	
FD32 H5	
FD33 H5	
FD34 H5	
FD35 J6	
FD36 H1	
FD41 F14	
FD42 F14	
FD43 J6	
FD44 J6	
FD45 J8	
FD55 C14	
FD56 C14	
FD57 C14	
FD58 D14	
FD59 D14	
FD60 D14	
FD61 D14	
FD62 D14	
FD63 D14	
FD64 D14	

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SSB: MT5382-HDMI & Mux

B4E MT5382 - HDMI & MUX

B4E

HDMI 1 1E01 DC1R019WBER220

HDMI 2 1E02 DC1R019WBER220

HDMI 3 1E03 DC1R019WBER220

HDMI (SIDE) 1E04 DC1R019JBAR190

TO FLASH&NVM B4C

TO ANALOG/IOs B4F

TO DC-DC B1

TO AUDIO B3 &

TO LVDS B4D

7E18 SII9185ACTU

7A01-7 MT5362 HDMI

7E23 WT61P7-RG440WT

7E24 BD45275G

7E28 PCA9515A

RESERVED

ISP PROGRAMMING +3V3STBY B4B-PH-SM4-TBT(LF)

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SSB: MT5382-Analog I/Os

B4F MT5382 - ANALOG I/Os

B4F

AV1

AV2

AV3

PC-AUDIO

SIDE-AV

SIDE-AV (RESERVED)

USB

SVHS-TOP

HEADPHONE

TRAP MODE | AOLRCK | AOBCK
NORM | 0 | 0
I2E | (1) | (0)
( ) DEFAULT VALUE

HEADPHONE	1W RATH-RM
FE84	Y
FE85	Y
FE86	Y
FE87	Y
FE88	--
FE91	--
FE94	Y
FE95	Y
FE48	Y
FE49	--
FE50	Y
FE51	Y
FE52	Y
FE53	--
FE54	--

HEADPHONE	1W RATH-RM
3F55	Y
3F91	Y
3F92	--
3F96	--
3F97	--
6F01	--
6F04	--
6F05	--
6F28	--
7F03-1	--
7F03-2	--
7F05	--

B4E TO HDMI
B7M TO PROIDIOM
B5P FROM MJC
B4D TO DISPLAY
B1 TO DC/DC
B4C TO FLASH&NVM
B3 TO CLASS-D
B7M TO PROIDIOM
B2 FROM TUNER
B4C TO FLASH&NVM
B4A TO POWER&TUNER
B3 FROM CLASS-D MUTING

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1F01-1 B5	2F98 J7	6F22 H15
1F01-2 D6	2F99 F15	6F25 J6
1F01-3 A6	3401 I4	6F26 J6
1F02-1 F5	3402 I4	6F27 J6
1F02-2 H6	3408 B12	6F28 D13
1F02-3 E6	3409 B12	7A01-10 H2
1F03 E10	3412 H16	7A01-11 B10
1F04-1 G10	3413 H16	7A01-9 F2
1F04-2 H10	3F01 A8	7F01 I8
1F04-3 H10	3F02 A8	7F03-1 C13
1F05-1 J10	3F03 D7	7F03-2 E13
1F05-2 I10	3F04 E8	7F04-1 C15
1F05-3 J10	3F07 C7	7F04-2 D15
1F06 I13	3F08 C8	7F05 D14
1F07 E13	3F09 G4	7F07 F14
1F08-1 G13	3F11 C8	7F08 F14
1F08-2 H13	3F12 G8	7F09 F14
1F08-3 I13	3F14 I7	7F10 F14
1F10 J5	3F15 I8	7F11 F14
1F12 A15	3F18 G7	7F12 F14
1F13 K7	3F19 G4	7F13 C2
2401 H15	3F20 G4	7F14 B6
2402 H15	3F22 H7	7F15 F6
2403 F12	3F23 G4	7F16 F10
2404 F12	3F25 F4	7F17 G10
2405 G12	3F26 G4	7F18 F11
2406 H11	3F27 G4	7F19 A4
2407 H11	3F28 G4	7F20 C4
2408 I11	3F29 G4	7F21 B4
2409 I11	3F30 G4	7F22 I10
2410 J11	3F31 H4	7F23 J10
2411 J11	3F32 H4	7F24 J10
2419 B15	3F33 H4	7F25 A6
2420 B15	3F34 H4	7F26 A6
2421 B15	3F35 E8	7F27 D6
2422 B16	3F36 F8	7F28 B6
2423 B16	3F37 B13	7F29 D6
2424 B16	3F38 B12	7F30 C6
2425 B16	3F39 B12	7F31 E6
2426 J11	3F40 B12	7F32 F6
2427 F7	3F41 G4	7F33 H6
2429 J11	3F43 B12	7F34 G6
2430 H11	3F44 B12	7F35 H6
2431 H14	3F45 B12	7F36 G6
2432 H14	3F46 C13	7F37 J6
2433 J14	3F47 C13	7F38 J6
2434 J14	3F48 C12	7F39 J6
2435 H11	3F49 C13	7F40 I8
2436 A4	3F50 C13	7F41 J8
2437 H3	3F51 E15	7F42 A15
2438 I3	3F52 E15	7F43 A15
2439 I3	3F53 E13	7F44 A16
2440 I4	3F54 E15	7F45 B6
2441 D11	3F55 E15	7F46 A16
2442 D12	3F56 C15	7F47 B15
2443 I3	3F57 D15	7F49 E10
2444 I3	3F58 F11	7F50 G10
2445 H1	3F59 F11	7F51 E14
2446 H1	3F60 F12	7F52 E8
2447 H1	3F61 F12	7F53 A15
2F04 D4	3F62 G11	7F54 A16
2F05 D4	3F63 G12	7F55 B15
2F07 E4	3F64 H12	7F56 B15
2F08 E4	3F65 H12	7F57 B15
2F09 D15	3F66 I12	7F58 B15
2F10 E4	3F67 I12	7F59 B15
2F11 E4	3F68 J11	7F60 B15
2F12 C15	3F69 J11	7F61 B15
2F13 A2	3F70 F15	7F62 B15
2F14 A2	3F71 F15	7F63 B15
2F15 B7	3F72 F16	7F64 B15
2F16 B2	3F73 F16	7F65 B15
2F17 B2	3F74 G15	7F66 B15
2F18 B7	3F75 G4	7F67 B15
2F19 C2	3F76 F12	7F68 B15
2F20 C2	3F77 H12	7F69 B15
2F21 J8	3F78 F16	7F70 B15
2F22 J9	3F79 K7	7F71 B15
2F24 A4	3F80 K7	7F72 B15
2F25 A4	3F81 K8	7F73 B15
2F26 F7	3F82 K8	7F74 B15
2F27 B4	3F83 G16	7F75 B15
2F28 B4	3F84 B13	7F76 B15
2F30 C4	3F85 B13	7F77 B15
2F31 C4	3F86 H16	7F78 B15
2F33 C4	3F91 C16	7F79 B15
2F34 C4	3F92 C16	7F80 B15
2F36 C2	3F93 B12	7F81 B15
2F37 C2	3F94 B12	7F82 B15
2F38 C14	3F95 I14	7F83 B15
2F39 E14	3F96 C12	7F84 B15
2F41 A7	3F97 D13	7F85 B15
2F42 A7	3F98 B12	7F86 B15
2F43 F15	4F01 H14	7F87 B15
2F44 D8	4F02 H14	7F88 B15
2F46 F11	4F03 C13	7F89 B15
2F47 C8	4F04 C13	7F90 B15
2F49 G11	4F05 D14	7F91 B15
2F50 C8	4F07 C6	7F92 B15
2F52 E7	4F08 G6	7F93 B15
2F53 F7	5F01 D3	7F94 B15
2F54 G15	5F02 D3	7F95 B15
2F55 I8	5F03 E3	7F96 B15
2F57 F15	5F04 A1	7F97 B15
2F58 G8	5F05 B1	7F98 B15
2F60 F11	5F06 A3	7F99 B15
2F61 G8	5F07 B3	7F100 B15
2F63 F3	5F08 B3	7F101 B15
2F64 G3	5F09 C3	7F102 B15
2F65 G3	5F10 C1	7F103 B15
2F66 G3	5F13 D7	7F104 B15
2F67 G3	5F15 B7	7F105 B15
2F68 G3	5F17 D7	7F106 B15
2F69 G3	5F19 H7	
2F70 G3	5F21 F7	
2F71 G3	5F23 H7	
2F72 G3	5F24 J7	
2F73 G3	5F25 B1	
2F74 G3	5F31 I4	
2F75 H3	6F01 B7	
2F76 H3	6F02 B7	
2F77 H3	6F03 D7	
2F78 H3	6F04 C7	
2F79 I3	6F05 C7	
2F80 C9	6F06 F7	
2F81 D9	6F07 F7	
2F82 C12	6F08 H7	
2F83 C12	6F09 G7	
2F84 C12	6F10 G7	
2F85 C12	6F11 F11	
2F86 C13	6F12 F11	
2F87 C13	6F13 G11	
2F88 D13	6F14 H11	
2F89 D13	6F15 H11	
2F92 C14	6F16 J11	
2F93 C14	6F17 J11	
2F94 D16	6F18 F14	
2F95 D16	6F19 F15	
2F96 F16	6F20 G14	
2F97 G15	6F21 H15	

SSB: MJC MT8280-Power

B5P MJC MT8280 - POWER

B5P

+3V3_SW
5P14 30R
2P89 100n
FP17
FLASH
7P02 M25P16-VMF
VCC
Φ 2Mx8 FLASH
SF_S0 FP14 15 D
SF_CK FP15 16 C
SF_CS0 FP16 7 S
+3V3_SW 3P16 4K7 9 W
+3V3_SW 1 HOLD
+3V3_SW
VSS 10
Q 8 SF_DO FG18
DU 3 4 5 6 11 12 13 14 NC
3P32 10K
FP24
7P03 PDTC114ET

FLASH_MJC_WE

+3V3_SW 5P03 30R FP03
2P37 4u7
2P38 100n
2P39 100n C8
2P40 100n D9
2P41 100n W7
2P42 100n W19
2P43 1u0 Y20
DVDD33
+1V8_SW 5P01 30R FP01
2P01 4u7 A1
2P02 100n B2
2P03 100n C6
2P04 100n D7
2P05 100n F3
2P06 100n G1
2P07 100n G4
2P08 100n H2
2P09 100n M1
2P10 10n M4
2P11 10n N3
2P12 10n U2
2P13 10n V1
2P14 10n V4
2P15 10n W3
2P16 10n AA4
2P17 1u0 AB3
2P18 1u0
DVDD18
+1V1_SW 5P02 30R FP02 J10
+1V1_SW 5P08 30R J13
+1V1_SW 5P09 30R J14
2P19 4u7 K9
2P20 100n K11
2P21 100n K12
2P22 100n K14
2P23 100n L10
2P24 100n L13
2P25 100n M10
2P26 100n M13
2P27 100n N9
2P28 100n N11
2P29 100n N12
2P30 100n N14
2P31 100n P10
2P32 10n P13
2P33 10n P14
2P34 1u0
2P35 1u0
2P36 1u0
DVDD10
7P01-1 MT8280
Φ POWER
DVSS
A4 B5 C3 D1 D4 E2 J3 J9 J11 J12 K1 K4 K10 K13 L9 L11 L12 L14 M9 M11 M12 M14 N10 N13 P2 P9 P11 P12 R1 R4 T3 W6 Y2 Y5 AA1

+1V2 5P07 30R FP07
+1V2 5P06 30R FP06
+1V2 5P05 30R FP05
2P44 10u 10V
2P45 1u0
2P46 100n
2P47 4u7
2P48 100n
2P49 4u7
2P50 100n
2P51 4u7
+3V3_SW 5P04 30R FP04
2P77 10u
2P78 1u0
2P80 10u
2P79 100n

7P01-5 MT8280
V20 AVDD33
U20 AVSS33
V21
V22
XTAL
(SYSPLL MJCPLL DMPLL)
AVDD12
NS_XTAL
Φ PHERIPHERAL
PRST W18
PWN Y18
EFUSE W15
RXD AB21
TXD AA20
GPIO 0 1 2 3 4 5
AVSS_PLL
R20 R21 R22
T20 T22 T21

3P09 820K 2P82 22p
1P01 27M0
2P81 22p
3P24 10K
3P22 0R
3P23 0R
UART_1RX 3P17 100R
UART_1TX 3P18 100R
3P29 10K RES
8280_DETECT 3P25 100R Y6
BACKLIGHT_ON_OFF 3P30 100R RES Y7
LCD_PWR_ON 3P31 100R RES Y16
FLASH_MJC_WE W16
W17
V16

SCL Y19 3P19 100R SCL
SDA AB20 3P20 100R SDA
SFCS A7 3P12 4K7 RES +3V3_SW
SFCK D8 3P13 4K7
SFDI B8
SFDO A8 3P14 4K7 RES +3V3_SW
3P15 4K7
JTMS Y22 FP18
JTRST W21 FP19 3P02 10K RES +3V3_SW
JTRCK AA22 FP20 3P07 10K
JTCK Y21 FP21
JTDI W20 FP22
JTDO AA21 FP23 3P04 4K7 +3V3_SW
3P05 4K7 RES
INT0 V17 3P21 0R INT0
3P01 10K RES +3V3_SW
TN0 U21 NC
TP0 U22 NC

TO FLASH&NVM B 4 C
TO FLASH&NVM B 4 C
B 1
B 4 D

TRAP MODE	JTDO	JTRST	SFCK	SFDO
TEST_CPUM	X	0	1	1
NORM	(1)	(0)	(1)	(1)

( ) DEFAULT MODE

1P01 D5 3P30 E5
2P01 B1 3P31 E5
2P02 B1 3P32 B8
2P03 B1 5P01 B1
2P04 B1 5P02 C1
2P05 B1 5P03 A1
2P06 B1 5P04 C5
2P07 C1 5P05 C5
2P08 C1 5P06 B5
2P09 C1 5P07 B5
2P10 C1 5P08 C1
2P11 C1 5P09 D1
2P12 C1 5P14 A10
2P13 C1 7P01-1 A2
2P14 C1 7P01-5 D6
2P15 C1 7P02 A9
2P16 C1 7P03 B9
2P17 C1 FG18 A10
2P18 C1 FP01 B1
2P19 D1 FP02 C1
2P20 D1 FP03 A1
2P21 D1 FP04 C6
2P22 D1 FP05 C6
2P23 D1 FP06 B6
2P24 D1 FP07 B6
2P25 D1 FP14 A9
2P26 D1 FP15 A9
2P27 D1 FP16 A9
2P28 D1 FP17 A10
2P29 D1 FP18 E8
2P30 D1 FP19 E8
2P31 D1 FP20 E8
2P32 E1 FP21 E8
2P33 E1 FP22 E8
2P34 E1 FP23 E8
2P35 E1 FP24 B9
2P36 E1
2P37 B1
2P38 B1
2P39 B1
2P40 B1
2P41 B1
2P42 B1
2P43 B1
2P44 C5
2P45 C5
2P46 C6
2P47 C6
2P48 C6
2P49 C6
2P50 C6
2P51 C6
2P77 D5
2P78 D5
2P79 D6
2P80 D6
2P81 D5
2P82 D5
2P89 A10
3P01 E8
3P02 E8
3P04 E8
3P05 E8
3P07 E8
3P09 D5
3P12 D8
3P13 D8
3P14 E8
3P15 E8
3P16 B9
3P17 E5
3P18 E5
3P19 D8
3P20 D8
3P21 E8
3P22 E5
3P23 E5
3P24 D5
3P25 E5
3P29 E5

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SSB: MJC MT8280-DDR2

B5Q MJC MT8280 - DDR2

B5Q

DDR #1

DDR #2

7P01-2 MT8280

7Q01 EDE2516ACSE-6E-E

7Q02 EDE2516ACSE-6E-E

+0V9_VTT

+1V8_SW

MEM_VREF

MJC_VREF

MJC_RA(0:12)

MJC_RDQ(0:31)

MJC_RDQS0

MJC_RDQS0n

MJC_RDQS1

MJC_RDQS1n

MJC_RDQS2

MJC_RDQS2n

MJC_RDQS3

MJC_RDQS3n

MJC_RDQM0

MJC_RDQM1

MJC_RDQM2

MJC_RDQM3

MJC_RCLK0

MJC_RCLK0n

MJC_RCLK1

MJC_RCLK1n

MJC_RBA0

MJC_RBA1

MJC_RCKE

MJC_RCSn

MJC_RRASn

MJC_RCASn

MJC_RWEn

MJC_RODT

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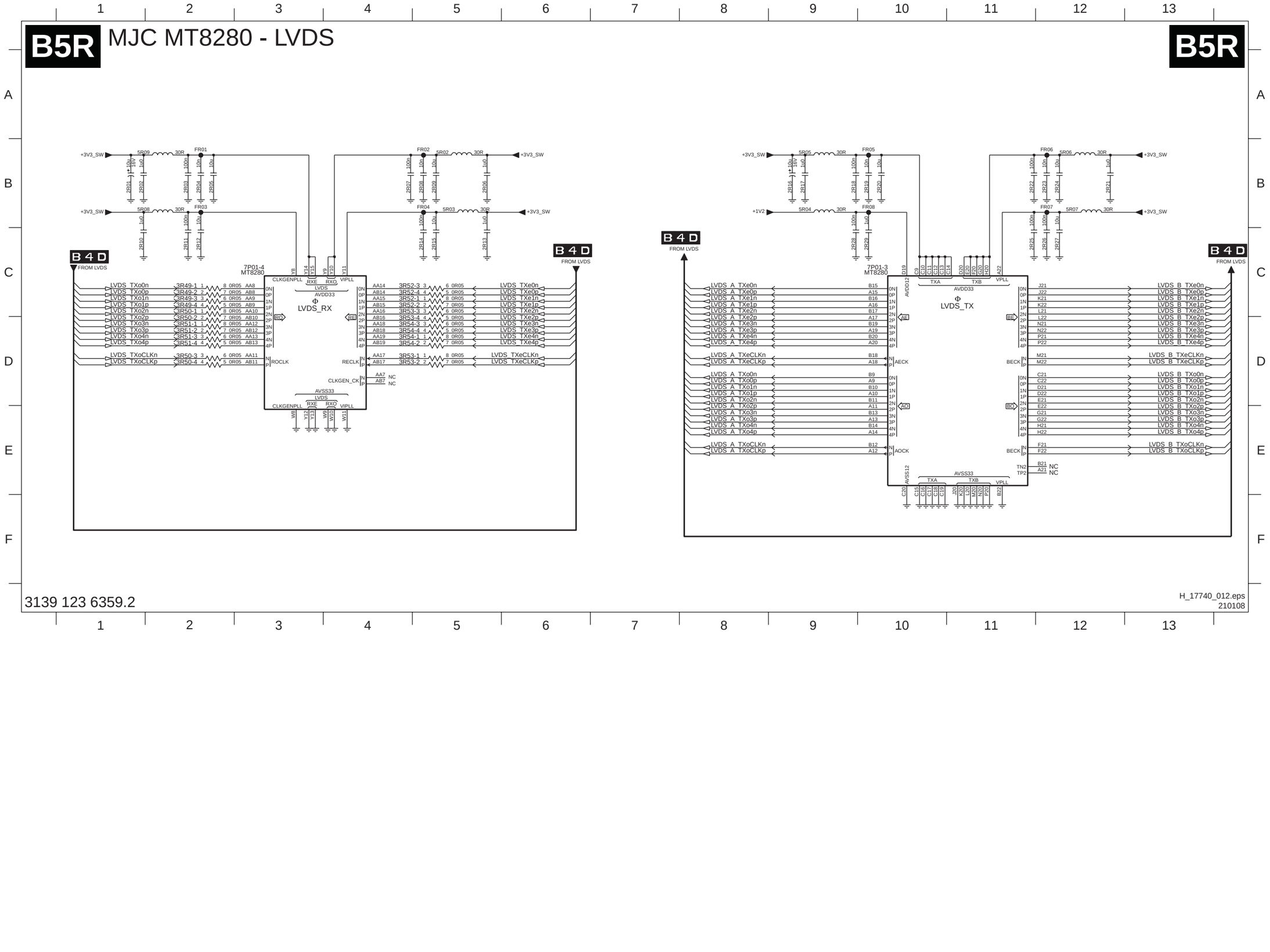
2Q01 E1 4Q01 B3
2Q02 F1 7P01-2 B2
2Q03 F1 7Q01 D5
2Q17 B5 7Q02 D9
2Q18 B5 FQ01 B6
2Q19 B9 FQ02 B10
2Q20 B9
2Q21 B6
2Q22 B6
2Q23 B6
2Q24 C6
2Q25 C6
2Q26 C6
2Q27 C6
2Q28 C6
2Q29 C6
2Q30 C6
2Q31 C6
2Q32 C6
2Q33 C6
2Q34 C6
2Q35 C6
2Q36 C6
2Q37 B10
2Q38 B10
2Q39 B10
2Q40 C10
2Q41 C10
2Q42 C10
2Q43 C10
2Q44 C10
2Q45 C10
2Q46 C10
2Q47 C10
2Q48 C10
2Q49 C10
2Q50 C10
2Q51 C10
2Q52 C10
2Q53 A6
2Q54 A6
2Q55 A6
2Q56 A6
2Q57 A6
2Q58 A7
2Q59 A7
2Q60 A7
2Q61 A7
2Q62 A7
2Q63 A7
2Q64 A7
2Q65 A7
3Q01 F3
3Q02 D3
3Q03 D3
3Q04 D3
3Q05 D3
3Q06 E5
3Q07 E8
3Q08 F3
3Q09-1 A5
3Q09-2 A5
3Q09-3 A5
3Q09-4 A5
3Q10 A8
3Q11-1 A5
3Q11-2 A5
3Q11-3 A6
3Q11-4 A6
3Q12-1 A8
3Q12-2 A8
3Q12-3 A6
3Q12-4 A5
3Q13-1 A6
3Q13-2 A5
3Q13-3 A8
3Q13-4 A5
3Q14-1 A9
3Q14-2 A9
3Q14-3 A9
3Q14-4 A9

SSB: MJC MT8280-LVDS

B5R MJC MT8280 - LVDS

B5R



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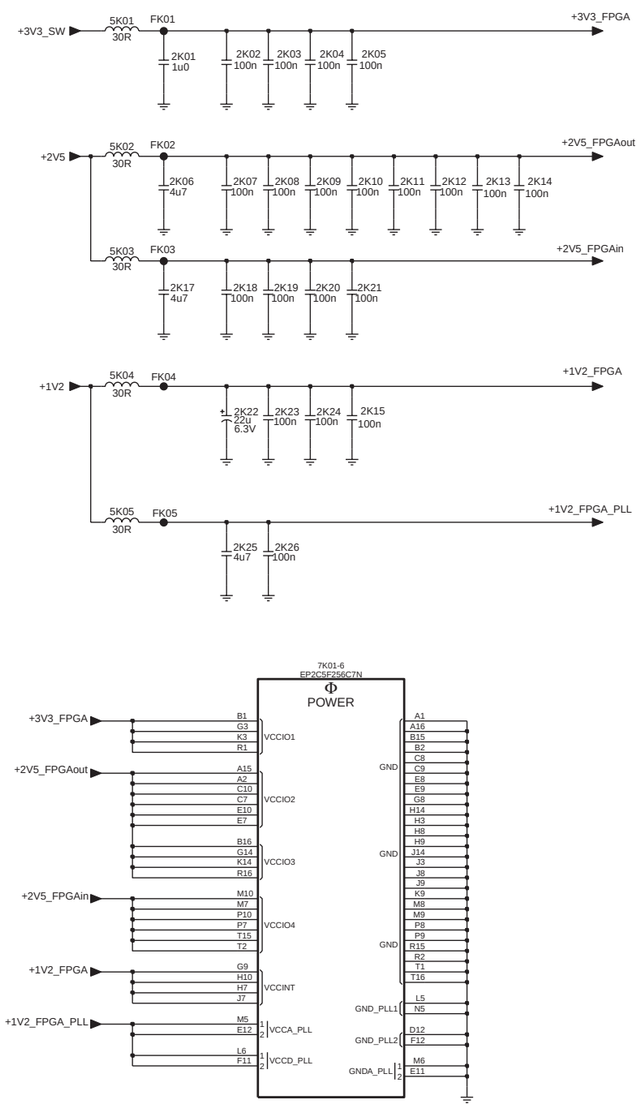
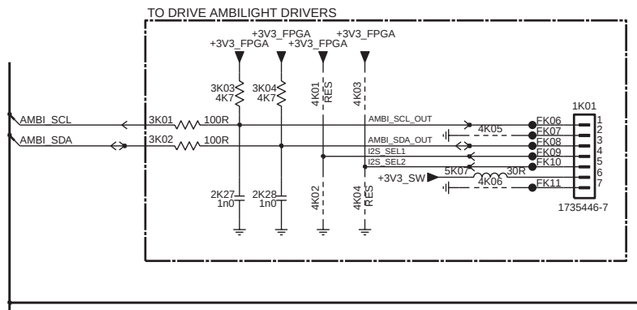
2R01 B1
2R02 B1
2R03 B2
2R04 B2
2R05 B2
2R06 B5
2R07 B4
2R08 B5
2R09 B5
2R10 C1
2R11 C2
2R12 C2
2R13 C5
2R14 C5
2R15 C5
2R16 B9
2R17 B9
2R18 B9
2R19 B10
2R20 B10
2R21 B12
2R22 B11
2R23 B12
2R24 B12
2R25 C11
2R26 C12
2R27 C12
2R28 C9
2R29 C10
3R49-1 C2
3R49-2 C2
3R49-3 C2
3R49-4 C2
3R50-1 C2
3R50-2 D2
3R50-3 D2
3R50-4 D2
3R51-1 D2
3R51-2 D2
3R51-3 D2
3R51-4 D2
3R52-1 C4
3R52-2 C4
3R52-3 C4
3R52-4 C4
3R53-1 D4
3R53-2 D4
3R53-3 C4
3R53-4 D4
3R54-1 D4
3R54-2 D4
3R54-3 D4
3R54-4 D4
5R02 B5
5R03 B5
5R04 B9
5R05 B9
5R06 B12
5R07 B12
5R08 B1
5R09 B1
7P01-3 C10
7P01-4 C3
FR01 B2
FR02 B5
FR03 B2
FR04 B5
FR05 B10
FR06 B12
FR07 B12
FR08 B10

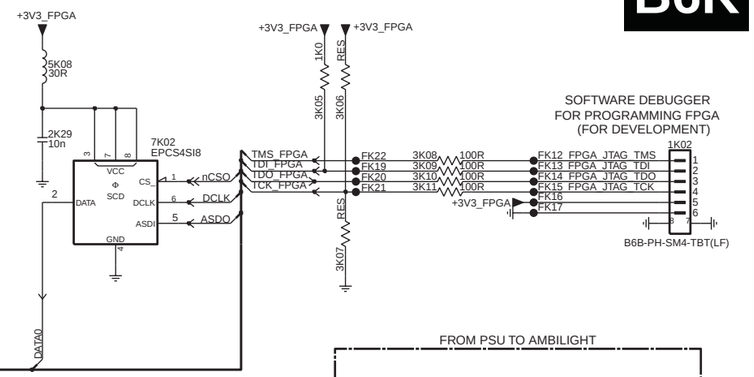
SSB: FPGA-AmbiLight

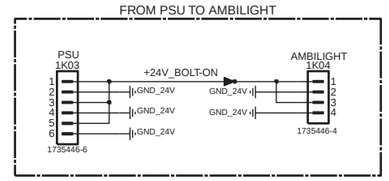
B6K FPGA - AMBILIGHT

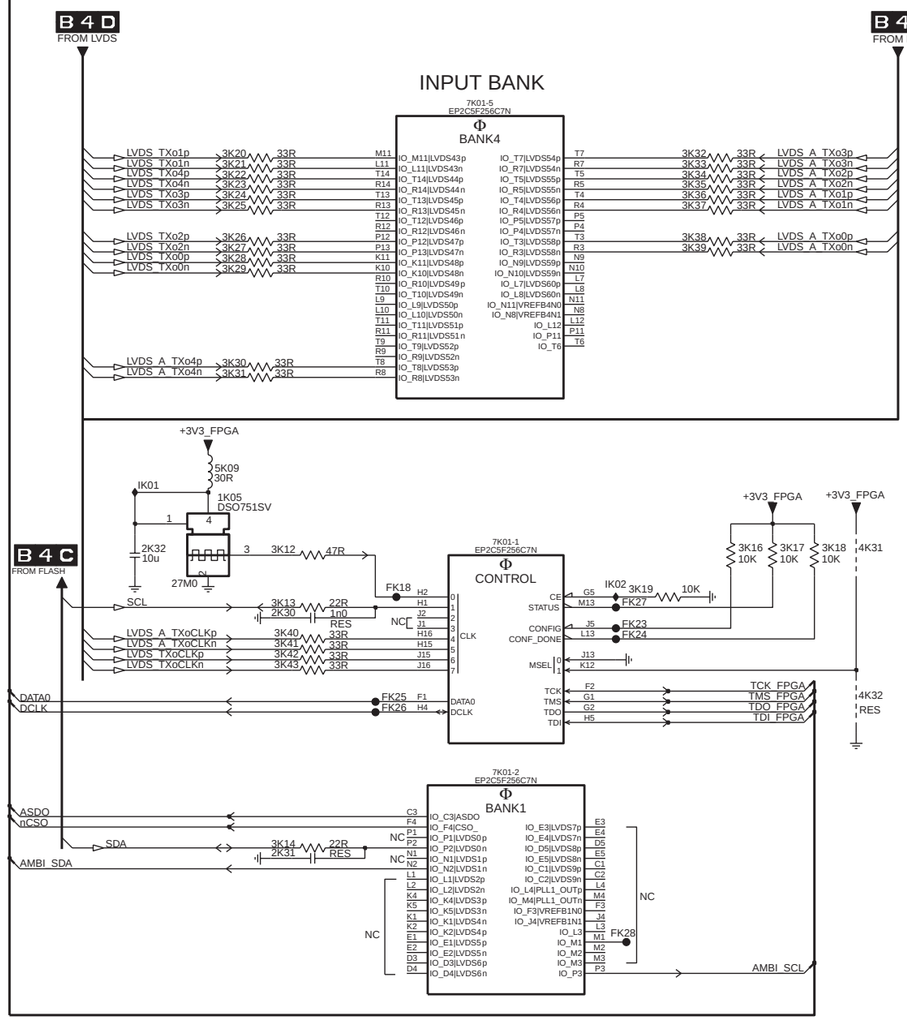
B6K











1K01 B9 FK22 B12
1K02 B14 FK23 H9
1K03 C12 FK24 H9
1K04 C14 FK25 H8
1K05 G6 FK26 H8
2K01 B2 FK27 H9
2K02 A2 FK28 J9
2K03 A2 IK01 G6
2K04 A3 IK02 G9
2K05 A3
2K06 B2
2K07 B2
2K08 B2
2K09 B3
2K10 B3
2K11 B3
2K12 B4
2K13 B4
2K14 B4
2K15 D3
2K17 C2
2K18 C2
2K19 C2
2K20 C3
2K21 C3
2K22 D2
2K23 D2
2K24 D3
2K25 E2
2K26 E2
2K27 B6
2K28 B7
2K29 B10
2K30 H7
2K31 I7
2K32 G6
3K01 B6
3K02 B6
3K03 B6
3K04 B7
3K05 A12
3K06 A12
3K07 B12
3K08 B12
3K09 B12
3K10 B12
3K11 B12
3K12 G7
3K13 H7
3K14 I7
3K16 G10
3K17 G10
3K18 G11
3K19 G9
3K20 D7
3K21 E7
3K22 E7
3K23 E7
3K24 E7
3K25 E7
3K26 E7
3K27 E7
3K28 E7
3K29 E7
3K30 F7
3K31 F7
3K32 D10
3K33 E10
3K34 E10
3K35 E10
3K36 E10
3K37 E10
3K38 E10
3K39 E10
3K40 H7
3K41 H7
3K42 H7
3K43 H7
4K01 B7
4K02 B7
4K03 B7
4K04 B7
4K05 B8
4K06 B8
4K31 G11
4K32 H11
5K01 A1
5K02 B1
5K03 C1
5K04 D1
5K05 E1
5K07 B8
5K08 A10
5K09 G7
7K01-1 G8
7K01-2 I8
7K01-3 F13
7K01-4 H13
7K01-5 D8
7K01-6 F3
7K01-7 E13
7K02 B10
FK01 A2
FK02 B2
FK03 C2
FK04 D2
FK05 E2
FK06 B9
FK07 B9
FK08 B9
FK09 B9
FK10 B9
FK11 B9
FK12 B13
FK13 B13
FK14 B13
FK15 B13
FK16 B13
FK17 B13
FK18 G8
FK19 B12
FK20 B12
FK21 B12

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SSB: ITV-Channel Decoder (Reserved)

1L01 F6 1L01 B2 1L02 C2 | 2L03 C2 2L04 D2 2L05 D2 | 2L06 D3 2L07 D3 2L08 D3 | 2L09 D3 2L10 D3 2L11 D7 | 2L12 D5 2L13 E5 2L14 E6 | 2L15 E7 2L16 D6 2L17 F5 | 2L18 F5 2L19 B2 2L20 B2 | 2L21 B3 2L22 B3 2L23 B3 | 2L24 B3 2L25 C2 2L26 C2 | 2L27 C3 2L33 E6 2L34 B6 | 2L39 D6 2L40 D7 3L04 B6 | 3L05-1 E12 3L05-2 E12 3L05-3 E12 | 3L05-4 E12 3L06-1 E12 3L06-2 F12 | 3L06-3 F12 3L06-4 F12 3L07-1 H11 | 3L07-2 H11 3L07-3 H11 3L07-4 H11 | 3L09 F6 3L10 C13 3L11 C13 | 3L12 D13 3L13 B9 3L14 B9 | 4L01 B6 4L02 B6 5L04 D6 | 5L05 C6 5L06 A2 5L07 B2 | 5L10 E6 5L11 C2 7L02 C8 | FL01 A3 FL02 B3 FL03 C3 | FL04 G9 IL01 D6 IL02 E6 | IL03 E6 IL04 F7 IL05 F7 | IL06 E14

1 2 3 4 5 6 7 8 9 10 11 12 13 14

B7L HOTEL TV - CHANNEL DECODER (RESERVED)

B7L

A B C D E F G H

+3V3_SW — 5L06 30R — FL01 — +3V3_DCD
2L01 100u 16V; 2L19 10u; 2L20 100n; 2L21 100n; 2L22 100n; 2L23 100n; 2L24 100n

+3V3_SW — 5L07 10u — FL02 — +3V3_ACD
2L02 100u 16V; 2L25 10u; 2L26 100n; 2L27 100n

+1V2 — 5L11 30R — FL03 — +1V1_CD
2L03 100u 16V; 2L04 100n; 2L05 100n; 2L06 100n; 2L07 100n; 2L08 100n; 2L09 100n; 2L10 100n

TO/FROM TUNER B2

TUNER_SDA, TUNER_SCL, IF_AGC_ChDec — 4L01, 4L02 — 3L04 10K — 2L34 4n7

+3V3_DCD: 3L13 4K7 1%; 3L14 4K7 1%

7L02 MT5112BD-L

+1V1_CD	NC	+3V3_DCD	+3V3_DCD	+1V1_CD	NC	+3V3_DCD	NC	NC	NC	+1V1_CD	NC	NC	+3V3_DCD	+1V1_CD	NC	NC	+3V3_DCD									
75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51		
VDD1.6	DGND1.6	RF_AGC	IF_AGC	DGMD3.3	VDD3.3	TUNER_CLK	TUNER_DATA	SA1	SA0	DGND1.6	VDD1.6	DGND1.6	ANT_TX	DGND3.3	VDD3.3	ANT_RX	ANT_DET	GPIO3	DGND1.6	VDD1.6	GPIO2	NC	VDD3.3	DGND3.3			

NC	NC	AVDD2	NC	NC	NC	AVSS9	NC	NC	AVDD9	AVSS5	AVDD5	NC	NC	AVDD3.3	DGND3.3	VDD3.3	VDD1.6	DGND1.6	NC	GPIO0	TSDATA7	TSDATA6	TSDATA5	TSDATA4		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		

FL04; NC

NC	NC	AVDD3	AVDD6	AVSS3	AVSS6	XTAL2	XTAL1	AVSS4	AVDD4	AVSS2	NC	AVDD1	NC	AVSS	REFBOT	VCMEXT	REFTOP	AVSS7	AVDD1.6	AVDD7	NC	NC	AVSS	NC	NC	NC	NC
93	94	95	96	97	98	99	100	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

+3V3_ACD — 5L05 30R — 2L16 100n — FATIN-, FATIN+ — 5L04 10u RES; 2L39 10n RES; 2L40 10n; 2L11 10n

2L12 100n; 2L13 100n; 2L14 10u; 2L15 100n — IL01, IL02

+3V3_ACD — 5L10 30R — IL03 — 2L33 100n

2L17 18p; 3L09 1M0; 1L01 25M0; 2L18 18p — IL04, IL05

FROM FLASH B4C

3L10 100R	CHDEC_RESET		
3L11 22R	SCL		
+1V1_CD			
3L12 22R	SDA		
+3V3_DCD			
+1V1_CD			
3L05-1 1 8.47R	TUN_FE_ERR	IL06	
3L05-2 2 7.47R	TUN_FE_VALID		
3L05-3 3 6.47R	TUN_FE_CLK		
+3V3_DCD			
3L05-4 4 5.47R	TUN_FE_SOP		
3L06-1 1 8.47R	TUN_FE_DATA(0)		
3L06-2 2 7.47R	TUN_FE_DATA(1)		
+1V1_CD			
3L06-3 3 6.47R	TUN_FE_DATA(2)		
3L06-4 4 5.47R	TUN_FE_DATA(3)		
+3V3_DCD			

TO PROIDIOM B7M

3L07-1 1 8.47R; 3L07-2 2 7.47R; 3L07-3 3 6.47R; 3L07-4 4 5.47R — TUN_FE_DATA(4), TUN_FE_DATA(5), TUN_FE_DATA(6), TUN_FE_DATA(7)

+3V3_ACD, +3V3_ACD, +3V3_DCD, +1V1_CD

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1 2 3 4 5 6 7 8 9 10 11 12 13 14

SSB: ITV-Pro:Idiom (Reserved)

B7M HOTEL TV - PROIDIOM (RESERVED)

B7M

7M01-2 EP2C5F256C7N — POWER

7M01-3 EP2C5F256C7N — NC

1M01 FI-RE21S-VF-R1300 — TO DMMI DIGITAL BOLT-ON — FM16

1M02 BM10B-SRSS-TBT — TO DMMI ANALOG BOLT-ON — FM26

1M04 BM06B-SRSS-TBT — FM32

FROM CH-DECODER B7L

FROM ANALOG-IOs B4F

FROM TUNER B2

FROM MT5382 B4C

7M01-1 EP2C5F256C7N — CONTROL

TO POWER&TUNER B4A

TO FLASH&NVM B4C

IM01 IM02 IM03 IM04 IM05 IM06 IM07

FM01 FM02 FM03 FM04 FM05 FM06 FM07 FM08 FM09 FM10 FM11 FM12 FM13 FM14 FM15 FM16 FM17 FM18 FM19 FM20 FM21 FM22 FM23 FM24 FM25 FM26 FM27 FM28 FM29 FM30 FM31 FM32 FM33 FM34

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SSB: SRP List Explanation

Example

Net Name	*Diagram*
+12-15V	AP1 (4x)
+12-15V	AP4 (4x)
+12-15V	AP5 (12x)
+12-15V	AP6 (4x)
+12-15V	AP7 (8x)
+12V	AP1 (4x)
+12V_NF	AP1 (2x)
+12VAL	AP1 (2x)
+25VLP	AP1 (4x)
+25VLP	AP2 (1x)
+3V3-STANDBY	AP5 (3x)
+400V-F	AP1 (2x)
+400V-F	AP2 (2x)
+400V-F	AP3 (2x)
+5V2	AP1 (6x)
+5V2	AP2 (1x)
+5V2-NF	AP1 (1x)
+5V2-NF	AP2 (1x)
+5V-SW	AP1 (6x)
+5V-SW	AP2 (1x)
+8V6	AP1 (3x)
+AUX	AP1 (2x)
+AUX	AP2 (1x)
+DC-F	AP1 (2x)
+DC-F	AP3 (2x)
+SUB-SPEAKER	AP5 (1x)
+SUB-SPEAKER	AP6 (2x)
-12-15V	AP1 (4x)
-12-15V	AP4 (6x)
-12-15V	AP5 (14x)
-12-15V	AP6 (6x)
-12-15V	AP7 (8x)
AL-OFF	AP1 (2x)
AUDIO-L	AP4 (1x)
AUDIO-L	AP5 (1x)
AUDIO-PROT	AP5 (3x)
AUDIO-R	AP4 (1x)
AUDIO-R	AP5 (1x)
AUDIO-SW	AP5 (1x)
AUDIO-SW	AP7 (1x)
BOOST	AP1 (2x)
CPROT	AP4 (2x)
CPROT	AP5 (1x)
CPROT-SW	AP5 (1x)
CPROT-SW	AP6 (2x)
-DC-F	AP1 (2x)
-DC-F	AP3 (2x)
DC-PROT	AP1 (1x)
DC-PROT	AP5 (2x)
DIM-CONTROL	AP1 (2x)
FEEDBACK+SW	AP6 (2x)
FEEDBACK-L	AP4 (2x)
FEEDBACK-R	AP4 (2x)
FEEDBACK-SW	AP6 (2x)
GND-AL	AP1 (2x)
GNDHA	AP1 (40x)
GNDHA	AP2 (20x)
GNDHA	AP3 (2x)
GNDHOT	AP3 (2x)
GND-L	AP1 (2x)
GND-L	AP4 (4x)
GND-L	AP5 (34x)
GND-LL	AP4 (7x)
GND-LL	AP5 (1x)
GND-LR	AP4 (7x)
GND-LR	AP5 (1x)
GND-LSW	AP5 (1x)
GND-LSW	AP6 (15x)
GND-S	AP1 (11x)
GND-SA	AP4 (8x)
GND-SA	AP5 (2x)
GND-SA	AP6 (8x)
GND-SA	AP7 (6x)
GNDscrew	AP3 (2x)
GNDscrew	AP5 (2x)
GND-SSB	AP5 (3x)
GND-SSP	AP1 (51x)
GND-SSP	AP2 (15x)
IN+SW	AP6 (2x)
IN-L	AP4 (2x)
IN-R	AP4 (2x)
IN-SW	AP6 (2x)
INV-MUTE	AP4 (1x)
INV-MUTE	AP5 (1x)
INV-MUTE	AP6 (1x)
LEFT-SPEAKER	AP4 (1x)
LEFT-SPEAKER	AP5 (1x)
MUTE	AP4 (2x)
MUTE	AP5 (1x)
MUTE	AP6 (2x)
ON-OFF	AP1 (3x)
OUT	AP6 (1x)
OUT	AP7 (2x)
OUTN	AP6 (1x)
OUTN	AP7 (1x)
POWER-GOOD	AP1 (2x)
POWER-OK-PLATFORM	AP1 (2x)
RIGHT-SPEAKER	AP4 (1x)
RIGHT-SPEAKER	AP5 (1x)
SOUND-ENABLE	AP5 (3x)
STANDBY	AP1 (5x)
STANDBY	AP2 (1x)
-SUB-SPEAKER	AP5 (1x)
-SUB-SPEAKER	AP6 (2x)
V-CLAMP	AP1 (1x)
V-CLAMP	AP3 (2x)

1.1. Introduction

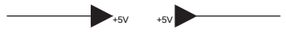
SRP (Service Reference Protocol) is a software tool that creates a list with all references to signal lines. The list contains references to the signals within all schematics of a PWB. It replaces the text references currently printed next to the signal names in the schematics. These printed references are created manually and are therefore not guaranteed to be 100% correct. In addition, in the current crowded schematics there is often none or very little place for these references.
Some of the PWB schematics will use SRP while others will still use the manual references. Either there will be an SRP reference list for a schematic, or there will be printed references in the schematic.

1.2. Non-SRP Schematics

There are several different signals available in a schematic:

1.2.1. Power Supply Lines

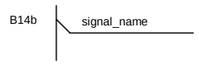
All power supply lines are available in the supply line overview (see chapter 6). In the schematics (see chapter 7) is not indicated where supplies are coming from or going to.
It is however indicated if a supply is incoming (created elsewhere), or outgoing (created or adapted in the current schematic).



Outgoing Incoming

1.2.2. Normal Signals

For normal signals, a schematic reference (e.g. B14b) is placed next to the signals.

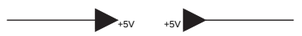


1.2.3. Grounds

For normal and special grounds (e.g. GNDHOT or GND3V3 etc.), nothing is indicated.

1.3. SRP Schematics

SRP is a tool, which automatically creates a list with signal references, indicating on which schematic the signals are used.
A reference is created for all signals indicated with an SRP symbol, these symbols are:

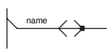


Power supply line.

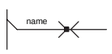
Stand alone signal or switching line (used as less as possible).

Signal line into a wire tree.

Switching line into a wire tree.



Bi-directional line (e.g. SDA) into a wire tree.



Signal line into a wire tree, its direction depends on the circuit (e.g. ingoing for PDP, outgoing for LCD sets).

Remarks:

- When there is a black dot on the "signal direction arrow" it is an SRP symbol, so there will be a reference to the signal name in the SRP list.
- All references to normal grounds (Ground symbols without additional text) are not listed in the reference list, this to keep it concise.
- Signals that are not used in multiple schematics, but only once or several times in the same schematic, are included in the SRP reference list, but only with one reference.

Additional Tip:

When using the PDF service manual file, you can very easily search for signal names and follow the signal over all the schematics. In Adobe PDF reader:

- Select the signal name you want to search for, with the "Select text" tool.
- Copy and paste the signal name in the "Search PDF" tool.
- Search for all occurrences of the signal name.
- Now you can quickly jump between the different occurrences and follow the signal over all schematics. It is advised to "zoom in" to e.g. 150% to see clearly, which text is selected. Then you can zoom out, to get an overview of the complete schematic.

PS. It is recommended to use at least Adobe PDF (reader) version 6.x, due to better search possibilities in this version.

E_06532_031.eps
230606

Personal Notes:

SSB: SRP List Part 1

Netname	Schematic
+0V9_VTT	B4B (2x)
+12VAAudio	B3 (2x)
+12VAudio	B1 (1x)
+12VAudio	B3 (1x)
+12VAudio	B4F (1x)
+12VDAudio	B3 (2x)
+12Vdisp	B1 (2x)
+12Vdisp	B4D (1x)
+12Vdisp_DETECT	B1 (2x)
+12Vdisp_DETECT	B4F (1x)
+12VS	B1 (3x)
+12VS	B2 (1x)
+12VS	B4C (1x)
+1V1_CD	B7L (8x)
+1V1_FPGA	B6K (2x)
+1V1_FPGA_PLL	B6K (2x)
+1V1_RGBADC	B4F (2x)
+1V1_RGBFE	B4F (2x)
+1V1_SW	B1 (3x)
+1V1_SW	B4A (5x)
+1V1_SW	B4E (1x)
+1V1_SW	B4F (1x)
+1V1_SW	B5P (4x)
+1V1_SW	B6K (1x)
+1V1_SW	B7L (1x)
+1V1_VGA	B4F (2x)
+1V8_SW	B1 (3x)
+1V8_SW	B4A (1x)
+1V8_SW	B4B (7x)
+1V8_SW	B4E (1x)
+1V8_SW	B5P (1x)
+1V8_SW	B5Q (3x)
+1V8HDMI_AMUX	B4E (3x)
+1V8HDMI_DMUX	B4E (2x)
+24V_BOLT-ON	B6K (1x)
+2V5	B1 (1x)
+2V5	B4A (1x)
+2V5	B4F (1x)
+2V5	B6K (1x)
+2V5_AVADC	B4F (2x)
+2V5_DVADC	B4F (2x)
+2V5_FPGAin	B6K (2x)
+2V5_FPGAout	B6K (2x)
+2V5_REF	B4F (2x)
+2V5_VFE	B4F (3x)
+3V3_ACD	B7L (5x)
+3V3_ADC	B4F (3x)
+3V3_DAC	B4F (2x)
+3V3_DCD	B7L (10x)
+3V3_DIG	B4F (2x)
+3V3_FPGA	B6K (13x)
+3V3_LVDS	B4D (5x)
+3V3_PI	B7M (4x)
+3V3_PLL	B4D (2x)
+3V3_REFP	B4F (2x)
+3V3_SW	B1 (4x)
+3V3_SW	B4A (2x)
+3V3_SW	B4C (21x)
+3V3_SW	B4D (3x)
+3V3_SW	B4E (3x)
+3V3_SW	B4F (4x)
+3V3_SW	B5P (13x)
+3V3_SW	B5R (8x)
+3V3_SW	B6K (2x)
+3V3_SW	B7L (2x)
+3V3_SW	B7M (5x)
+3V3HDMI_AMUX	B4E (2x)
+3V3STBY	B1 (2x)
+3V3STBY	B3 (2x)
+3V3STBY	B4C (5x)
+3V3STBY	B4E (9x)
+3V3STBY	B7M (1x)
+5V_HDMI_1	B4E (4x)
+5V_HDMI_2	B4E (3x)
+5V_HDMI_3	B4E (3x)
+5V_HDMI_BDS	B4E (1x)
+5V_HDMI_Mux	B4E (2x)
+5V_HDMI_SIDE	B4E (3x)
+5V_SW	B1 (3x)
+5V_SW	B2 (1x)
+5V_SW	B4C (1x)
+5V_SW	B4D (1x)
+5V_SW	B4E (7x)
+5V_SW	B4F (1x)
+5Vdisp	B1 (1x)
+5Vdisp	B4D (1x)
+5VHDMI_1	B4E (2x)
+5VHDMI_2	B4E (2x)
+5VHDMI_3	B4E (2x)
+5VHDMI_SIDE	B4E (2x)
+5VS	B2 (6x)
+5Vtuner	B2 (2x)
+VDISP	B4D (4x)
-12VAAudio	B3 (5x)
-12VAudio	B1 (1x)
-12VAudio	B3 (1x)
-12VAudio	B4F (1x)
-12VDAudio	B3 (3x)
5V	B4F (1x)
8280_DETECT	B4C (2x)
8280_DETECT	B5P (2x)
AMBI_SCL	B6K (2x)
AMBI_SCL_OUT	B6K (1x)
AMBI_SDA	B6K (2x)
AMBI_SDA_OUT	B6K (1x)
ANA-DIG_DIM_SELECT	B1 (2x)
ANA-DIG_DIM_SELECT	B4C (2x)
ANA-DIG_DIM_SELECT	B4F (1x)
ANTI_PLOP	B3 (2x)
ANTI_PLOP	B4C (2x)
ASDO	B6K (2x)
ASPDIF	B4F (1x)
AV3_CVBS_in	B4F (1x)
AV3_L_in	B4F (1x)
AV3_R_in	B4F (1x)
AV3_SC_in	B4F (1x)
AV3_SY_in	B4F (1x)
BACKLIGHT_BOOST	B1 (2x)
BACKLIGHT_BOOST	B4C (2x)
BACKLIGHT_ON_OFF	B1 (2x)
BACKLIGHT_ON_OFF	B4F (1x)
BACKLIGHT_ON_OFF	B5P (2x)

CEC	B4C (2x)
CEC	B4E (7x)
CHDEC_RESET	B4C (2x)
CHDEC_RESET	B7L (2x)
CHIP_DETECT	B4F (1x)
CTRL_DISP1_uP	B4C (2x)
CTRL_DISP1_uP	B4D (2x)
CTRL_DISP4_uP	B4C (2x)
CTRL_DISP4_uP	B4D (2x)
CVBS_OUT	B2 (2x)
CVBS_OUT	B4F (2x)
CVBS_OUT	B7M (2x)
DATA0	B6K (2x)
DC_PROT	B3 (2x)
DC_PROT	B4C (2x)
DCLK	B6K (2x)
DDC_RESET	B4C (2x)
DDC_RESET	B4E (8x)
DDC_SCL_1	B4E (1x)
DDC_SCL_2	B4E (1x)
DDC_SCL_3	B4E (1x)
DDC_SCL_HDMI_1	B4C (2x)
DDC_SCL_HDMI_1	B4E (2x)
DDC_SCL_HDMI_2	B4E (2x)
DDC_SCL_HDMI_3	B4E (1x)
DDC_SCL_HDMI_MUX	B4C (2x)
DDC_SCL_HDMI_MUX	B4E (2x)
DDC_SCL_HDMI_SIDE	B4E (1x)
DDC_SCL_SIDE	B4E (1x)
DDC_SDA_1	B4E (1x)
DDC_SDA_2	B4E (1x)
DDC_SDA_3	B4E (1x)
DDC_SDA_HDMI_1	B4C (2x)
DDC_SDA_HDMI_1	B4E (2x)
DDC_SDA_HDMI_2	B4E (2x)
DDC_SDA_HDMI_3	B4E (1x)
DDC_SDA_HDMI_MUX	B4C (2x)
DDC_SDA_HDMI_MUX	B4E (2x)
DDC_SDA_HDMI_SIDE	B4E (1x)
DDC_SDA_SIDE	B4E (1x)
DM	B4F (1x)
DP	B4F (1x)
EDID_WE	B4C (2x)
EDID_WE	B4E (8x)
FATIN-	B2 (2x)
FATIN-	B7L (2x)
FATIN+	B2 (2x)
FATIN+	B7L (2x)
FLASH_MJC_WE	B5P (1x)
FLASH_WE	B4C (1x)
FLASH_WE	B4F (1x)
GND_24V	B6K (5x)
Gnd_CVBS_OUT	B2 (1x)
Gnd_CVBS_OUT	B4F (1x)
GND1V2	B1 (5x)
GND1V8	B1 (5x)
GND3V3	B1 (5x)
GND5V	B1 (5x)
GNDDC1	B1 (14x)
GNDDC2	B1 (29x)
GNDSND	B1 (1x)
GNDSND	B3 (22x)
HDMI_HPD_1	B4C (2x)
HDMI_HPD_1	B4E (2x)
HDMI_HPD_2	B4C (2x)
HDMI_HPD_2	B4E (2x)
HDMI_HPD_3	B4C (2x)
HDMI_HPD_3	B4E (2x)
HDMI_HPD_SIDE	B4C (1x)
HDMI_HPD_SIDE	B4E (2x)
HDMI_RESET	B4C (2x)
HDMI_RESET	B4E (2x)
HP_DETECT	B4C (4x)
HP_DETECT	B4F (3x)
HP_LOUT	B3 (2x)
HP_LOUT	B4F (3x)
HP_ROUT	B3 (2x)
HP_ROUT	B4F (2x)
I2S_SEL1	B6K (1x)
I2S_SEL2	B6K (1x)
IF_AGC_ChDec	B2 (2x)
IF_AGC_ChDec	B7L (2x)
IF_AGC_MAIN	B2 (2x)
IF_AGC_MAIN	B4A (2x)
INT_CEC	B4E (1x)
INT_CEC	B4F (1x)
INT0	B4C (2x)
INT0	B5P (1x)
INTERRUPT	B4F (1x)
INTERRUPT	B7M (2x)
IR	B4C (3x)
IR	B4E (1x)
IR	B7M (2x)
JRTCK	B4C (2x)
JTAG_DBGACK	B4C (2x)
JTAG_DBGRQ	B4C (2x)
JTCK	B4C (2x)
JTDI	B4C (2x)
JTDO	B4C (2x)
JTMS	B4C (2x)
JTRSTn	B4C (2x)
KEYBOARD	B4C (2x)
KEYBOARD	B4E (2x)
LCD_PWR_ON	B4D (3x)
LCD_PWR_ON	B4F (1x)
LCD_PWR_ON	B5P (2x)
LED1	B4C (2x)
LED1	B4E (1x)
LED2	B4C (2x)
LED2	B4E (1x)
LEFT-	B3 (2x)
LVDS_A_TXe0n	B4D (2x)
LVDS_A_TXe0n	B5R (2x)
LVDS_A_TXe0p	B4D (2x)
LVDS_A_TXe0p	B5R (2x)
LVDS_A_TXe1n	B4D (2x)
LVDS_A_TXe1n	B5R (2x)
LVDS_A_TXe1p	B4D (2x)
LVDS_A_TXe1p	B5R (2x)
LVDS_A_TXe2n	B4D (2x)
LVDS_A_TXe2n	B5R (2x)
LVDS_A_TXe2p	B4D (2x)
LVDS_A_TXe2p	B5R (2x)
LVDS_A_TXe3n	B4D (2x)

LVDS_A_TXe3n	B5R (2x)
LVDS_A_TXe3p	B4D (2x)
LVDS_A_TXe3p	B5R (2x)
LVDS_A_TXe4n	B4D (2x)
LVDS_A_TXe4n	B5R (2x)
LVDS_A_TXe4p	B4D (2x)
LVDS_A_TXe4p	B5R (2x)
LVDS_A_TXeCLKn	B4D (2x)
LVDS_A_TXeCLKn	B5R (2x)
LVDS_A_TXeCLKp	B4D (2x)
LVDS_A_TXeCLKp	B5R (2x)
LVDS_A_TXo0n	B4D (2x)
LVDS_A_TXo0n	B5R (2x)
LVDS_A_TXo0p	B4D (2x)
LVDS_A_TXo0p	B5R (2x)
LVDS_A_TXo1n	B4D (2x)
LVDS_A_TXo1n	B5R (2x)
LVDS_A_TXo1p	B4D (2x)
LVDS_A_TXo1p	B5R (2x)
LVDS_A_TXo2n	B4D (2x)
LVDS_A_TXo2n	B5R (2x)
LVDS_A_TXo2p	B4D (2x)
LVDS_A_TXo2p	B5R (2x)
LVDS_A_TXo3n	B4D (2x)
LVDS_A_TXo3n	B5R (2x)
LVDS_A_TXo3p	B4D (2x)
LVDS_A_TXo3p	B5R (2x)
LVDS_A_TXo4n	B4D (2x)
LVDS_A_TXo4n	B5R (2x)
LVDS_A_TXo4p	B4D (2x)
LVDS_A_TXo4p	B5R (2x)
LVDS_A_TXoCLKn	B4D (2x)
LVDS_A_TXoCLKn	B5R (2x)
LVDS_A_TXoCLKp	B4D (2x)
LVDS_A_TXoCLKp	B5R (2x)
LVDS_B_TXe0n	B4D (2x)
LVDS_B_TXe0n	B5R (2x)
LVDS_B_TXe0p	B4D (2x)
LVDS_B_TXe0p	B5R (2x)
LVDS_B_TXe1n	B4D (2x)
LVDS_B_TXe1n	B5R (2x)
LVDS_B_TXe1p	B4D (2x)
LVDS_B_TXe1p	B5R (2x)
LVDS_B_TXe2n	B4D (2x)
LVDS_B_TXe2n	B5R (2x)
LVDS_B_TXe2p	B4D (2x)
LVDS_B_TXe2p	B5R (2x)
LVDS_B_TXe3n	B4D (2x)
LVDS_B_TXe3n	B5R (2x)
LVDS_B_TXe3p	B4D (2x)
LVDS_B_TXe3p	B5R (2x)
LVDS_B_TXe4n	B4D (2x)
LVDS_B_TXe4n	B5R (2x)
LVDS_B_TXe4p	B4D (2x)
LVDS_B_TXe4p	B5R (2x)
LVDS_B_TXeCLKn	B4D (2x)
LVDS_B_TXeCLKn	B5R (2x)
LVDS_B_TXeCLKp	B4D (2x)
LVDS_B_TXeCLKp	B5R (2x)
LVDS_B_TXo0n	B4D (2x)
LVDS_B_TXo0n	B5R (2x)
LVDS_B_TXo0p	B4D (2x)
LVDS_B_TXo1n	B4D (2x)
LVDS_B_TXo1n	B5R (2x)

LVDS_TXeCLKn	B5R (2x)
LVDS_TXeCLKn	B6K (2x)
LVDS_TXeCLKp	B4D (5x)
LVDS_TXeCLKp	B5R (2x)
LVDS_TXeCLKp	B6K (2x)
LVDS_TXo0n	B4D (5x)
LVDS_TXo0n	B5R (2x)
LVDS_TXo0n	B6K (2x)
LVDS_TXo0n_FPGA	B6K (1x)
LVDS_TXo0p	B4D (5x)
LVDS_TXo0p	B5R (2x)
LVDS_TXo0p	B6K (2x)
LVDS_TXo0p_FPGA	B6K (1x)
LVDS_TXo1n	B4D (5x)
LVDS_TXo1n	B5R (2x)
LVDS_TXo1n	B6K (2x)
LVDS_TXo1n_FPGA	B6K (1x)
LVDS_TXo1p	B4D (5x)
LVDS_TXo1p	B5R (2x)
LVDS_TXo1p	B6K (2x)
LVDS_TXo1p_FPGA	B6K (1x)
LVDS_TXo2n	B4D (5x)
LVDS_TXo2n	B5R (2x)
LVDS_TXo2n	B6K (2x)
LVDS_TXo2n_FPGA	B6K (1x)
LVDS_TXo2p	B4D (5x)
LVDS_TXo2p	B5R (2x)
LVDS_TXo2p	B6K (2x)
LVDS_TXo2p_FPGA	B6K (1x)
LVDS_TXo3n	B4D (5x)
LVDS_TXo3n	B5R (2x)
LVDS_TXo3n	B6K (2x)
LVDS_TXo3n_FPGA	B6K (1x)
LVDS_TXo3p	B4D (5x)
LVDS_TXo3p	B5R (2x)
LVDS_TXo3p	B6K (2x)
LVDS_TXo3p_FPGA	B6K (1x)
LVDS_TXo4n	B4D (6x)
LVDS_TXo4n	B5R (2x)
LVDS_TXo4n	B6K (2x)
LVDS_TXo4n_FPGA	B6K (1x)
LVDS_TXo4p	B4D (6x)
LVDS_TXo4p	B5R (2x)
LVDS_TXo4p	B6K (2x)
LVDS_TXo4p_FPGA	B6K (1x)
LVDS_TXoCLKn	B4D (5x)
LVDS_TXoCLKn	B5R (2x)
LVDS_TXoCLKn	B6K (2x)
LVDS_TXoCLKp	B4D (5x)
LVDS_TXoCLKp	B5R (2x)
LVDS_TXoCLKp	B6K (2x)
LVDS_SCL_DISP	B4D (1x)
LVDS1_TXe0n	B4D (1x)
LVDS1_TXe0p	B4D (1x)
LVDS1_TXe1n	B4D (1x)
LVDS1_TXe1p	B4D (1x)
LVDS1_TXe2n	B4D (1x)
LVDS1_TXe2p	B4D (1x)
LVDS1_TXe3n	B4D (1x)
LVDS1_TXe3p	B4D (1x)
LVDS1_TXe4n	B4D (1x)
LVDS1_TXe4p	B4D (1x)
LVDS2_TXe0n	B4D (1x)
LVDS2_TXe0p	B4D (1x)
LVDS2_TXe1n	B4D (1x)
LVDS2_TXe1p	B4D (1x)
LVDS2_TXe2n	B4D (1x)
LVDS2_TXe2p	B4D (1x)
LVDS2_TXe3n	B4D (1x)
LVDS2_TXe3p	B4D (1x)
LVDS2_TXe4n	B4D (1x)
LVDS2_TXe4p	B4D (1x)
LVDS2_TXeCLKn	B4D (1x)
LVDS2_TXeCLKp	B4D (1x)
LVDS2_TXo0n	B4D (1x)
LVDS2_TXo0p	B4D (1x)
LVDS2_TXo1n	B4D (1x)
LVDS2_TXo1p	B4D (1x)
LVDS2_TXo2n	B4D (1x)
LVDS2_TXo2p	B4D (1x)
LVDS2_TXo3n	B4D (1x)
LVDS2_TXo3p	B4D (1x)
LVDS2_TXo4n	B4D (1x)
LVDS2_TXo4p	B4D (1x)
LVDS2_TXoCLKn	B4D (1x)
LVDS2_TXoCLKp	B4D (1x)
LVDS3_TXe0n	B4D (1x)
LVDS3_TXe0p	B4D (1x)
LVDS3_TXe1n	B4D (1x)
LVDS3_TXe1p	B4D (1x)
LVDS3_TXe2n	B4D (1x)
LVDS3_TXe2p	B4D (1x)
LVDS3_TXe3n	B4D (1x)
LVDS3_TXe3p	B4D (1x)
LVDS3_TXe4n	B4D (1x)
LVDS3_TXe4p	B4D (1x)
LVDS3_TXeCLKn	B4D (1x)
LVDS3_TXeCLKp	B4D (1x)
LVDS3_TXo0n	B4D (1x)
LVDS3_TXo0p	B4D (1x)
LVDS3_TXo1n	B4D (1x)
LVDS3_TXo1p	B4D (1x)
LVDS3_TXo2n	B4D (1x)
LVDS3_TXo2p	B4D (1x)
LVDS3_TXo3n	B4D (1x)
LVDS3_TXo3p	B4D (1x)
LVDS3_TXo4n	B4D (1x)
LVDS3_TXo4p	B4D (1x)
LVDS3_TXoCLKn	B4D (1x)
LVDS3_TXoCLKp	B4D (1x)

LVSD1_SDA_DISP	B4D (1x)
MEM_VREF	B4B (4x)
MEM_VREF	B5Q (2x)
MJC_RA(0)	B5Q (3x)
MJC_RA(1)	B5Q (3x)
MJC_RA(10)	B5Q (3x)
MJC_RA(11)	B5Q (3x)
MJC_RA(12)	B5Q (3x)
MJC_RA(2)	B5Q (3x)
MJC_RA(3)	B5Q (3x)
MJC_RA(4)	B5Q (3x)
MJC_RA(5)	B5Q (3x)
MJC_RA(6)	B5Q (3x)
MJC_RA(7)	B5Q (3x)
MJC_RA(8)	B5Q (3x)
MJC_RA(9)	B5Q (3x)
MJC_RBA0	B5Q (3x)
MJC_RBA1	B5Q (3x)
MJC_RCASn	B5Q (3x)
MJC_RCKE	B5Q (3x)
MJC_RCLK0n	B5Q (1x)
MJC_RCLK1n	B5Q (1x)
MJC_RCSn	B5Q (3x)
MJC_RDQ(0)	B5Q (2x)
MJC_RDQ(1)	B5Q (2x)
MJC_RDQ(10)	B5Q (2x)
MJC_RDQ(11)	B5Q (2x)
MJC_RDQ(12)	B5Q (2x)
MJC_RDQ(13)	B5Q (2x)
MJC_RDQ(14)	B5Q (2x)
MJC_RDQ(15)	B5Q (2x)
MJC_RDQ(16)	B5Q (2x)
MJC_RDQ(17)	B5Q (2x)
MJC_RDQ(18)	B5Q (2x)
MJC_RDQ(19)	B5Q (2x)
MJC_RDQ(2)	B5Q (2x)
MJC_RDQ(20)	B5Q (2x)
MJC_RDQ(21)	B5Q (2x)
MJC_RDQ(22)	B5Q (2x)
MJC_RDQ(23)	B5Q (2x)
MJC_RDQ(24)	B5Q (2x)
MJC_RDQ(25)	B5Q (2x)
MJC_RDQ(26)	B5Q (2x)
MJC_RDQ(27)	B5Q (2x)
MJC_RDQ(28)	B5Q (2x)
MJC_RDQ(29)	B5Q (2x)
MJC_RDQ(3)	B5Q (2x)
MJC_RDQ(30)	B5Q (2x)
MJC_RDQ(31)	B5Q (2x)
MJC_RDQ(4)	B5Q (2x)
MJC_RDQ(5)	B5Q (2x)
MJC_RDQ(6)	B5Q (2x)
MJC_RDQ(7)	B5Q (2x)
MJC_RDQ(8)	B5Q (2x)
MJC_RDQ(9)	B5Q (2x)
MJC_RDQM0	B5Q (2x)
MJC_RDQM1	B5Q (2x)
MJC_RDQM2	B5Q (2x)
MJC_RDQM3	B5Q (2x)
MJC_RDQS0	B5Q (1x)
MJC_RDQS0n	B5Q (2x)
MJC_RDQS1	B5Q (1x)
MJC_RDQS1n	B5Q (2x)
MJC_RDQS2	B5Q (1x)
MJC_RDQS2n	B5Q (2x)
MJC_RDQS3	B5Q (1x)
MJC_RDQS3n	B5Q (2x)
MJC_RODT	B5Q (3x)
MJC_RRASn	B5Q (3x)
MJC_RWEn	B5Q (3x)
MJC_VREF	B5Q (4x)
MUTEn	B3 (2x)
MUTEn	B4C (2x)
nCSO	B6K (2x)
PC_L_in	B4F (1x)
PC_R_in	B4F (1x)
POWER_DOWN	B3 (2x)
POWER_DOWN	B4C (4x)
POWER_DOWN	B4E (2x)
PreAmpL	B3 (2x)
PreAmpL	B4F (2x)
PreAmpR	B3 (2x)
PreAmpR	B4F (2x)
PRST	B4C (2x)
PRST	B5P (1x)
PWM_DIMMING	B1 (2x)
PWM_DIMMING	B4C (2x)
PWN	B4C (2x)
PWN	B5P (1x)
RA(0)	B4B (2x)
RA(1)	B4B (2x)
RA(10)	B4B (2x)
RA(11)	B4B (2x)
RA(12)	B4B (2x)
RA(2)	B4B (2x)
RA(3)	B4B (2x)
RA(4)	B4B (2x)
RA(5)	B4B (2x)
RA(6)	B4B (2x)
RA(7)	B4B (2x)
RA(8)	B4B (2x)
RA(9)	B4B (2x)
RCLK0n	B4B (1x)
RCLK1n	B4B (1x)
RDQ(0)	B4B (1x)
RDQ(1)	B4B (1x)
RDQ(10)	B4B (1x)
RDQ(11)	B4B (1x)
RDQ(12)	B4B (1x)
RDQ(13)	B4B (1x)
RDQ(14)	B4B (1x)
RDQ(15)	B4B (1x)
RDQ(16)	B4B (1x)
RDQ(17)	B4B (1x)
RDQ(18)	B4B (1x)
RDQ(19)	B4B (1x)
RDQ(2)	B4B (1x)
RDQ(20)	B4B (1x)
RDQ(21)	B4B (1x)
RDQ(22)	B4B (1x)
RDQ(23)	B4B (1x)
RDQ(24)	B4B (1x)
RDQ(25)	B4B (1x)
RDQ(26)	B4B (1x)

RDQ(27)	B4B (1x)
RDQ(28)	B4B (1x)
RDQ(29)	B4B (1x)
RDQ(3)	B4B (1x)
RDQ(30)	B4B (1x)
RDQ(31)	B4B (1x)
RDQ(4)	B4B (1x)
RDQ(5)	B4B (1x)
RDQ(6)	B4B (1x)
RDQ(7)	B4B (1x)
RDQ(8)	B4B (1x)
RDQ(9)	B4B (1x)
RDQM0	B4B (1x)
RDQM1	B4B (1x)
RDQM2	B4B (1x)
RDQM3	B4B (1x)
RDQS0n	B4B (1x)
RDQS1n	B4B (1x)
RDQS2n	B4B (1x)
RDQS3n	B4B (1x)
RESET_PI	B4C (2x)
RESET_PI	B7M (1x)
RIGHT+	B3 (2x)
RX1_0n	B4E (2x)
RX1_0p	B4E (2x)
RX1_1n	B4E (2x)
RX1_1p	B4E (2x)
RX1_2n	B4E (2x)
RX1_2p	B4E (2x)
RX1_Cn	B4E (2x)
RX1_Cp	B4E (2x)
RX2_0n	B4E (2x)
RX2_0p	B4E (2x)
RX2_1n	B4E (2x)
RX2_1p	B4E (2x)
RX2_2n	B4E (2x)
RX2_2p	B4E (2x)
RX2_Cn	B4E (2x)
RX2_Cp	B4E (2x)
RX3_0n	B4E (2x)
RX3_0p	B4E (2x)
RX3_1n	B4E (2x)
RX3_1p	B4E (2x)
RX3_2n	B4E (2x)
RX3_2p	B4E (2x)
RX3_Cn	B4E (2x)
RX3_Cp	B4E (2x)
RXBDS_0n	B4E (1x)
RXBDS_0p	B4E (1x)
RXBDS_1n	B4E (1x)
RXBDS_1p	B4E (1x)
RXBDS_2n	B4E (1x)
RXBDS_2p	B4E (1x)
RXBDS_Cn	B4E (1x)
RXBDS_Cp	B4E (1x)
RXMux_0n	B4E (2x)
RXMux_0p	B4E (2x)
RXMux_1n	B4E (2x)
RXMux_1p	B4E (2x)
RXMux_2n	B4E (2x)
RXMux_2p	B4E (2x)
RXMux_Cn	B4E (2x)
RXMux_Cp	B4E (2x)
RXSide_0n	B4E (2x)
RXSide_0p	B4E (2x)
RXSide_1n	B4E (2x)
RXSide_1p	B4E (2x)
RXSide_2n	B4E (2x)
RXSide_2p	B4E (2x)
RXSide_Cn	B4E (2x)
RXSide_Cp	B4E (2x)
SAV_CVBS_in	B4F (2x)
SAV_L_in	B4F (2x)
SAV_R_in	B4F (2x)
SAV_SC_in	B4F (2x)
SAV_SY_in	B4F (2x)
SCL	B4C (2x)
SCL	B4D (1x)
SCL	B4E (5x)
SCL	B5P (2x)
SCL	B6K (3x)
SCL	B7L (2x)
SCL	B7M (6x)
SCL_DISP	B4D (3x)
SDA	B4C (2x)
SDA	B4D (1x)
SDA	B4E (5x)
SDA	B5P (2x)
SDA	B6K (2x)
SDA	B7L (2x)
SDA	B7M (6x)
SDA_DISP	B4D (3x)
SIF_OUT	B2 (2x)
SIF_OUT	B4A (2x)
SIF_OUT_GND	B2 (2x)
SIF_OUT_GND	B4A (2x)
STANDBY	B1 (2x)
STANDBY	B4E (2x)
STANDBY	B7M (2x)
STANDBYn	B3 (2x)
STANDBYn	B4D (2x)
STANDBYn	B4E (1x)
TCK_FPGA	B6K (2x)
TDI_FPGA	B6K (2x)
TDO_FPGA	B6K (2x)
TMS_FPGA	B6K (2x)
TS_CLK	B4A (2x)
TS_CLK	B4C (2x)
TS_CLK	B7M (2x)
TS_DATA(0)	B4A (2x)
TS_DATA(0)	B7M (2x)
TS_DATA(1)	B4A (2x)
TS_DATA(1)	B7M (2x)
TS_DATA(2)	B4A (2x)
TS_DATA(2)	B7M (2x)
TS_DATA(3)	B4A (2x)
TS_DATA(3)	B7M (2x)
TS_DATA(4)	B4C (2x)
TS_DATA(4)	B7M (2x)
TS_DATA(5)	B4C (2x)
TS_DATA(5)	B7M (2x)
TS_DATA(6)	B4C (2x)
TS_DATA(6)	B7M (2x)
TS_DATA(7)	B4C (2x)

TS_DATA(7)	B7M (2x)
TS_SOP	B4A (2x)
TS_SOP	B7M (2x)
TS_VALID	B4A (2x)
TS_VALID	B7M (2x)
TUN_FE_CLK	B7L (2x)
TUN_FE_CLK	B7M (1x)
TUN_FE_DATA(0)	B7L (2x)
TUN_FE_DATA(0)	B7M (2x)
TUN_FE_DATA(1)	B7L (2x)
TUN_FE_DATA(1)	B7M (2x)
TUN_FE_DATA(2)	B7L (2x)
TUN_FE_DATA(2)	B7M (2x)
TUN_FE_DATA(3)	B7L (2x)
TUN_FE_DATA(3)	B7M (2x)
TUN_FE_DATA(4)	B7L (2x)
TUN_FE_DATA(4)	B7M (2x)
TUN_FE_DATA(5)	B7L (2x)
TUN_FE_DATA(5)	B7M (2x)
TUN_FE_DATA(6)	B7L (2x)
TUN_FE_DATA(6)	B7M (2x)
TUN_FE_DATA(7)	B7L (2x)
TUN_FE_DATA(7)	B7M (2x)
TUN_FE_ERR	B7L (1x)
TUN_FE_SOP	B7L (2x)
TUN_FE_SOP	B7M (1x)
TUN_FE_VALID	B7L (2x)
TUN_FE_VALID	B7M (1x)
TUNER_SCL	B2 (4x)
TUNER_SCL	B4A (2x)
TUNER_SCL	B7L (2x)
TUNER_SDA	B2 (4x)
TUNER_SDA	B4A (2x)
TUNER_SDA	B7L (2x)
TVREF#1	B4C (2x)
UART_1RX	B4C (2x)
UART_1RX	B5P (2x)
UART_1TX	B4C (2x)
UART_1TX	B5P (2x)
UART_2RX	B4C (2x)
UART_2RX	B7M (2x)
UART_2TX	B4C (2x)
UART_2TX	B7M (2x)
USB_DM	B4A (2x)
USB_DM	B4F (2x)
USB_DP	B4A (2x)
USB_DP	B4F (2x)
USB_OC	B4C (2x)
USB_OC	B4F (2x)
USB_PWE	B4C (2x)
USB_PWE	B4F (2x)
VGA_B	B4F (2x)
VGA_B	B7M (2x)
VGA_Bn	B4F (2x)
VGA_Bn	B7M (2x)
VGA_G	B4F (2x)
VGA_G	B7M (2x)
VGA_Gn	B4F (2x)
VGA_Gn	B7M (2x)
VGA_HSYNC	B4F (2x)
VGA_HSYNC	B7M (2x)
VGA_R	B4F (2x)
VGA_R	B7M (2x)
VGA_Rn	B4F (2x)
VGA_Rn	B7M (2x)
VGA_SOG	B4F (2x)
VGA_SOG	B7M (2x)
VGA_VSYNC	B4F (2x)
VGA_VSYNC	B7M (2x)
VIN_ATV	B2 (2x)
VIN_ATV	B4F (2x)
VIP_ATV	B2 (2x)
VIP_ATV	B4F (2x)

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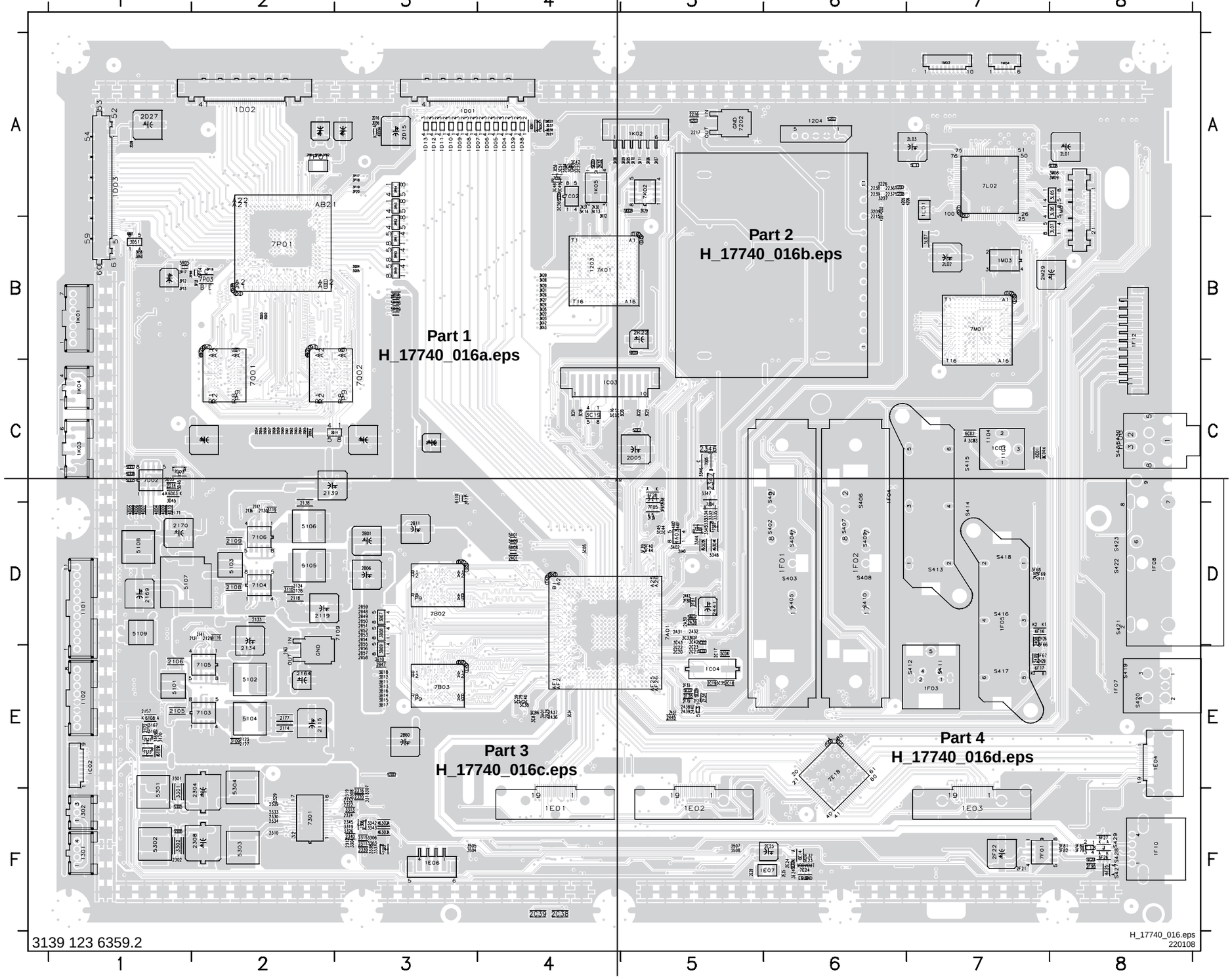
Layout Small Signal Board (Overview Top Side)



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U10 E2 U18 A8 1102 E1 1193 F3 1199 A8 1C02 E1 1D04 A4 1D10 A3 1E01 F4 1F01 D6 1F07 E8 1K02 A5 1M02 A7 2108 D2 2123 E2 2131 D2 2141 D2 2169 D1 2216 A5 2301 E1 2311 F3 2322 F3 2334 F2 2408 D7 2437 E5 2445 E5 2A37 E4 2B11 D3 3319 F3 3K26 B4 6D03 C1
U11 D2 U20 A3 1188 A4 1194 F4 1203 B6 1C03 C4 1D05 A4 1D11 A3 1E02 F5 1F02 D6 1F08 D8 1K03 C1 1M03 B7 2109 D2 2124 D2 2133 D2 2142 D2 2170 D1 2217 A5 2302 F1 2312 F3 2324 F3 2339 F3 2409 E7 2438 E5 2A01 D4 2A38 D5 2B47 E3 3326 F3 3K27 B4 6D04 A3
U12 D2 U22 A1 1189 A3 1195 F8 1204 A6 1C04 E5 1D06 A4 1D12 A3 1E03 F7 1F03 E7 1F10 F8 1K04 C1 1M04 A7 2114 E2 2127 E2 2134 D2 2157 E1 2171 D1 2236 A6 2304 F2 2315 F3 2329 F2 2340 F3 2410 D7 2439 E5 2A26 E4 2A39 D5 2B48 D3 3332 D5 3K28 B4 6E14 F6
U13 C2 U24 F7 1190 A1 1196 F6 1301 F1 1D01 A3 1D07 A4 1D13 A3 1E04 E8 1F04 D7 1F12 B8 1K05 A4 1P01 A2 2115 E2 2128 D2 2136 D2 2162 C3 2172 E1 2237 A6 2308 F2 2316 F3 2330 F2 2345 F3 2411 D7 2440 E5 2A31 D5 2A40 D5 2B49 D3 3333 D5 3K29 B4 6F16 D7
2B50 D3 3334 D5 3K42 B4 6F17 E7
2B51 D3 3335 D5 3K43 B4 6F25 F8
2B52 D3 3337 F3 3L05 A8 6F26 F8
2B53 D3 3338 F3 3L06 A8 6F27 F8
2B54 D3 3342 F3 3L07 B8 6F28 C5
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2B59 D3 3347 C5 3P13 B1 7109 E2
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2C18 E5 3505 F3 3P18 A3 7202 A5
2C19 E5 3507 F5 3P19 A3 7301 F2
2C20 E5 3508 F5 3P20 A3 7302 D5
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2C22 E5 3A02 D5 3Q02 B2 7304 D5
2C23 E5 3B07 D3 3Q03 B2 7305 C5
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2C25 A4 3B09 E3 3Q05 B3 7309 D5
2C26 A4 3B10 E3 3Q14 C2 7A01 D4
2C38 F4 3B11 E3 3R49 B3 7B02 D3
2C39 F4 3B12 E3 3R50 B3 7B03 E3
2D05 C5 3B13 E3 3R51 B3 7C02 A4
2D14 C1 3B14 E3 3R52 B3 7C06 A4
2D15 A3 3B15 E3 3R53 A3 7D02 C1
2D16 A3 3B16 E3 3R54 A3 7D03 C1
2D21 A4 3B17 E3 4201 B6 7E18 E6
2D22 A4 3B18 E3 4202 A6 7E24 F6
2D27 A1 3C03 C7 4205 A6 7F01 F7
2D28 A1 3C04 C7 4206 A7 7F05 D5
2E23 F6 3C05 D4 4A01 D5 7K01 B4
2E24 F6 3C16 C4 4A02 D5 7K02 A5
2E25 F6 3C17 C4 4A03 D5 7L02 A7
2E29 F5 3C18 C4 4C07 D5 7M01 B7
2E32 F6 3C19 C4 4D01 B1 7P01 B2
2F21 F7 3C20 C5 4D04 D1 7P03 B2
2F22 F7 3C21 C4 4D05 D1 7Q01 C2
2F27 E5 3C22 C5 4D06 D1 7Q02 C2
2F28 E5 3C23 C5 4D07 D1 S427 F8
2F33 E5 3C32 C4 4D09 D1 S428 F8
2F34 E5 3C33 D5 4D10 D1 S429 F8
2F38 C5 3C34 E4 5101 E1
2F39 D5 3C35 E5 5102 E2
2F79 E5 3C38 E4 5103 D2
2F80 D5 3C39 E4 5104 E2
2F81 D5 3C40 E4 5105 D2
2F98 F8 3C42 D5 5106 D2
2K22 B5 3C43 D5 5107 D1
2K29 A5 3C44 D5 5108 D1
2K30 A4 3C45 D5 5109 D1
2K31 A4 3C46 A4 5201 A5
2K32 A4 3C47 A4 5202 A6
2L01 A8 3C48 A4 5207 A6
2L02 B7 3C49 A4 5208 A6
2L03 A7 3C50 A4 5301 F1
2M29 B8 3C51 A4 5302 F1
2P19 B3 3C52 A4 5303 F2
2P44 A2 3C53 A4 5304 E2
2P81 A2 3C79 E4 5305 F1
2P82 A2 3C86 E4 5306 F1
2P89 B1 3C87 E4 5307 E3
2Q17 C2 3D37 A4 5A01 D4
2Q19 C3 3D38 A4 5A07 D5
2Q53 C2 3D45 C1 5A08 D4
2Q54 C2 3D46 C1 5A09 D4
2Q55 C2 3D51 B1 5C01 E5
2Q56 C2 3D55 C1 5C02 D5
2Q57 C2 3D56 A3 5C04 E5
2Q58 C2 3D58 B1 5C09 A4
2Q59 C2 3D60 B1 5D01 C5
2Q60 C2 3E23 F6 5D05 C1
2Q61 C2 3E24 F6 5D06 C1
2Q62 C2 3F39 D5 5D07 C1
2Q63 C2 3F40 D5 5E04 F6
2Q64 C2 3F44 D5 5F07 E5
2Q65 C2 3F66 D7 5F09 E5
2R01 A3 3F67 E7 5F24 F8
2R16 B1 3F68 D7 5F31 E5
2R17 B1 3F69 D7 5K04 B5
3109 E2 3F79 F8 5K08 A5
3110 D2 3F80 F8 5K09 A4
3116 D2 3F81 F8 5L06 A8
3119 D2 3F82 F8 5L07 B7
3167 E1 3F97 D5 5L11 A7
3168 E1 3K05 A5 5P02 B3
3169 E1 3K06 A5 5P08 B3
3170 E1 3K07 A5 5P09 B3
3171 C3 3K08 A4 5P14 B2
3209 A6 3K09 A5 5R05 B1
3226 A6 3K10 A5 6108 E1
3227 A6 3K11 A5 6109 E1
3301 F1 3K12 A4 6110 C3
3302 F1 3K13 A4 6302 F3
3303 F3 3K14 A4 6303 F3
3304 F3 3K20 B4 6304 D5
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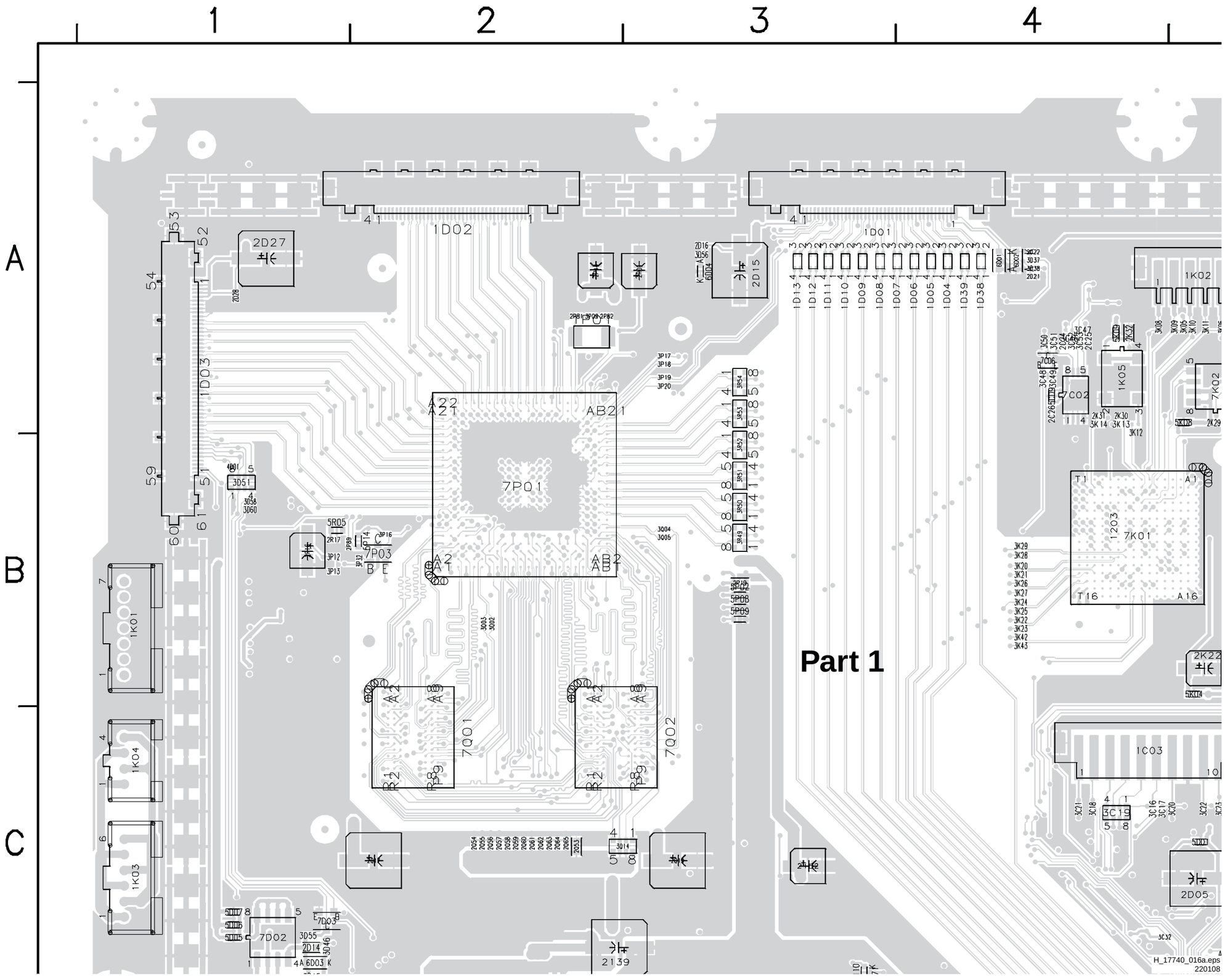
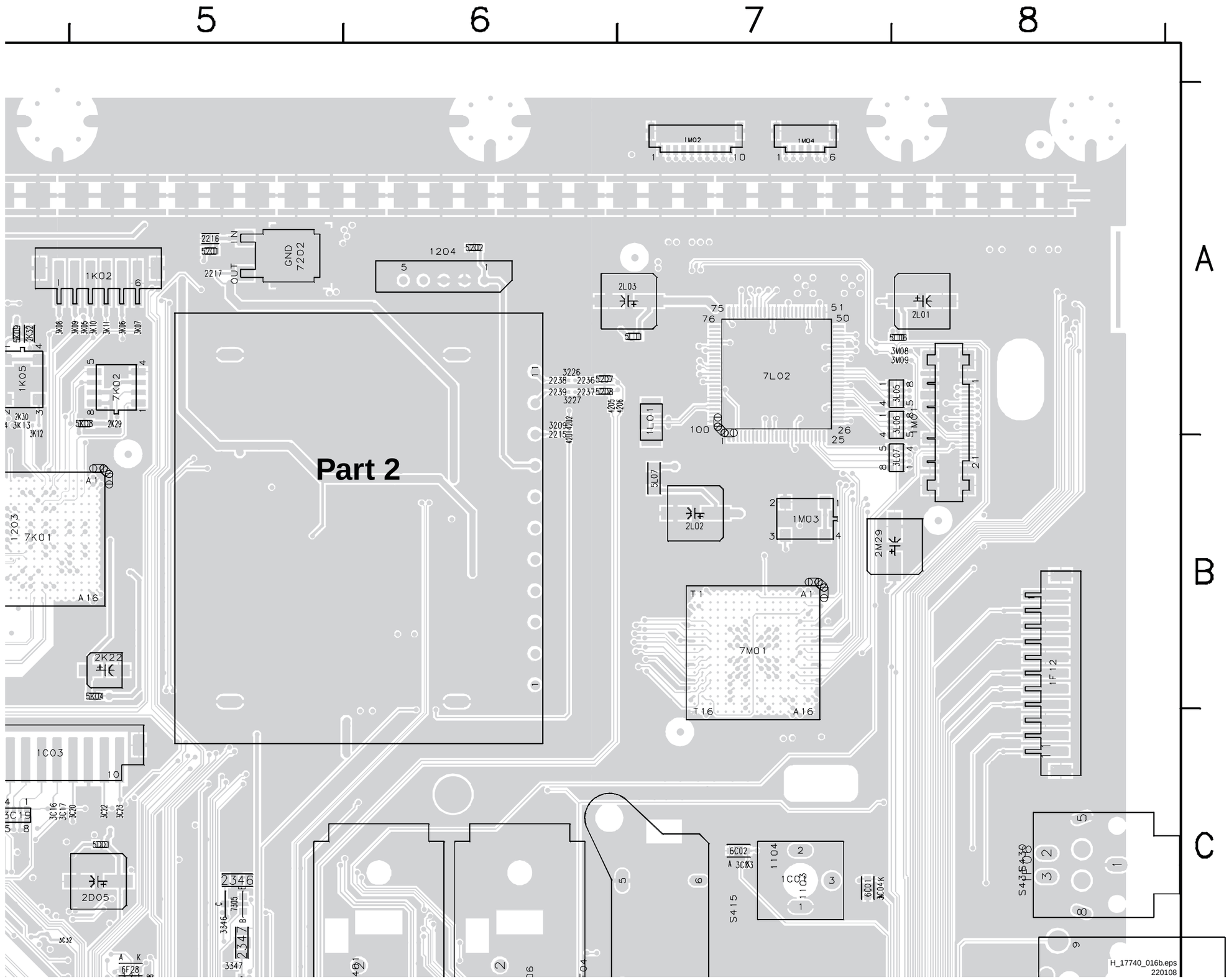
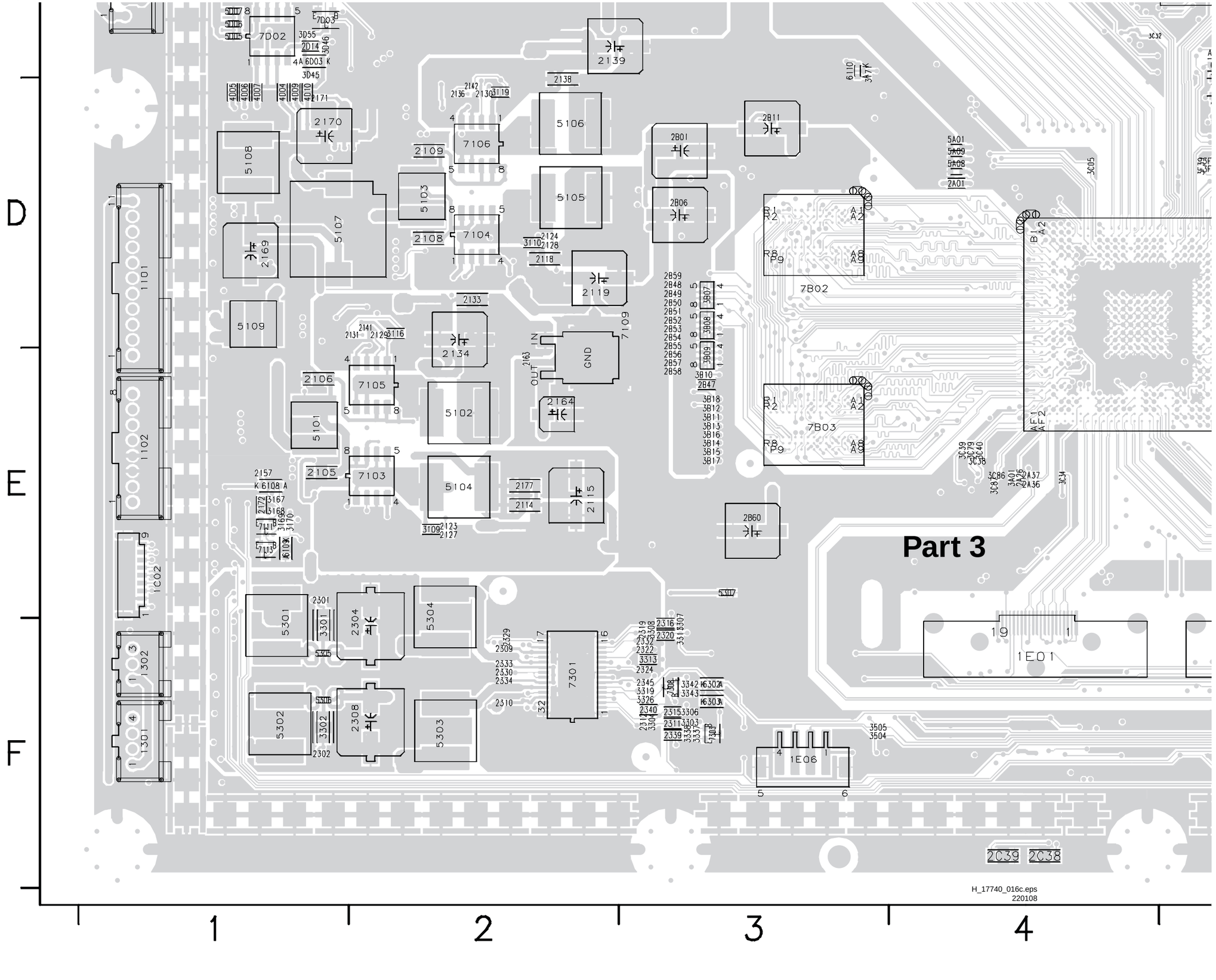
Layout Small Signal Board (Part 1 Top Side)



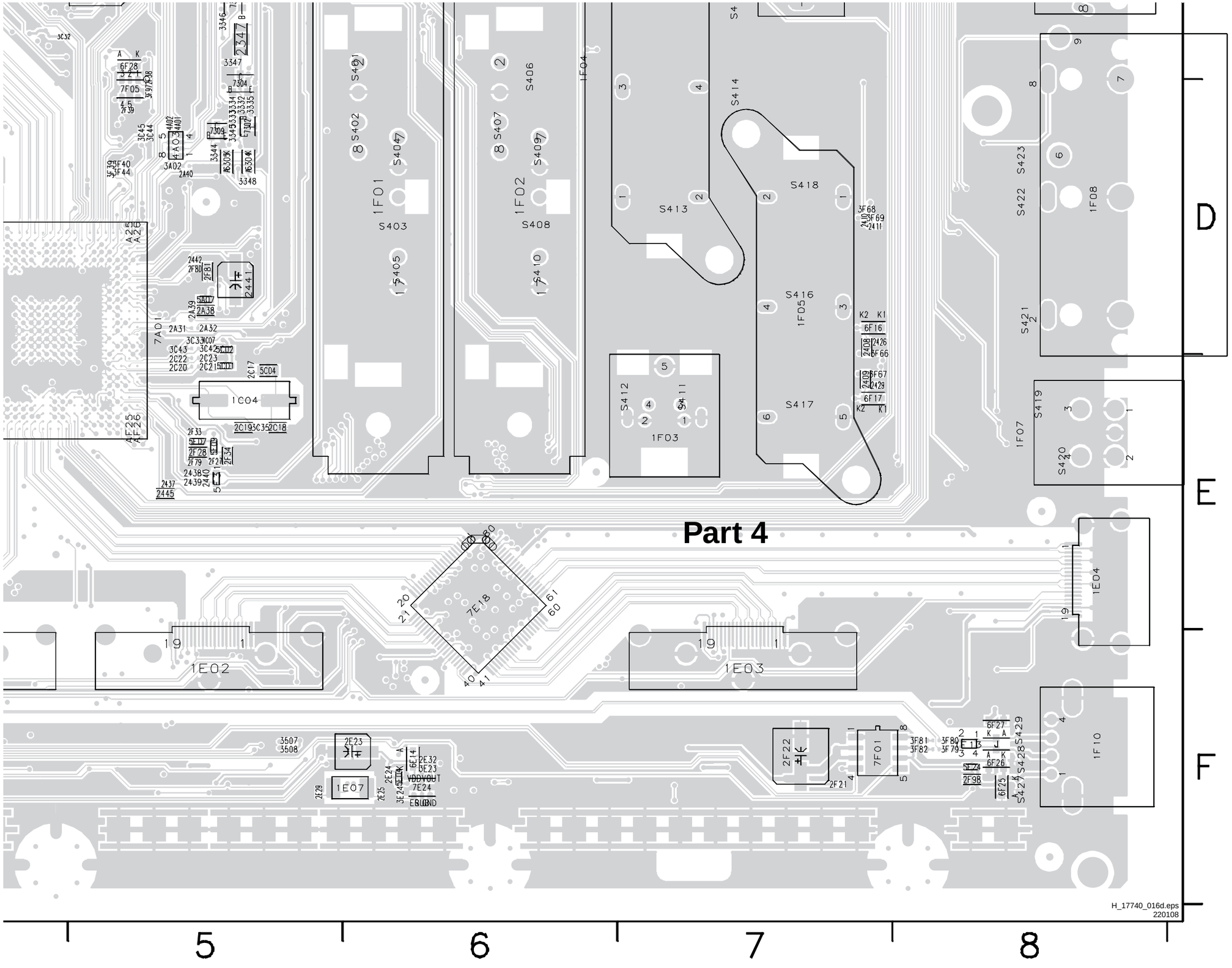
Layout Small Signal Board (Part 2 Top Side)



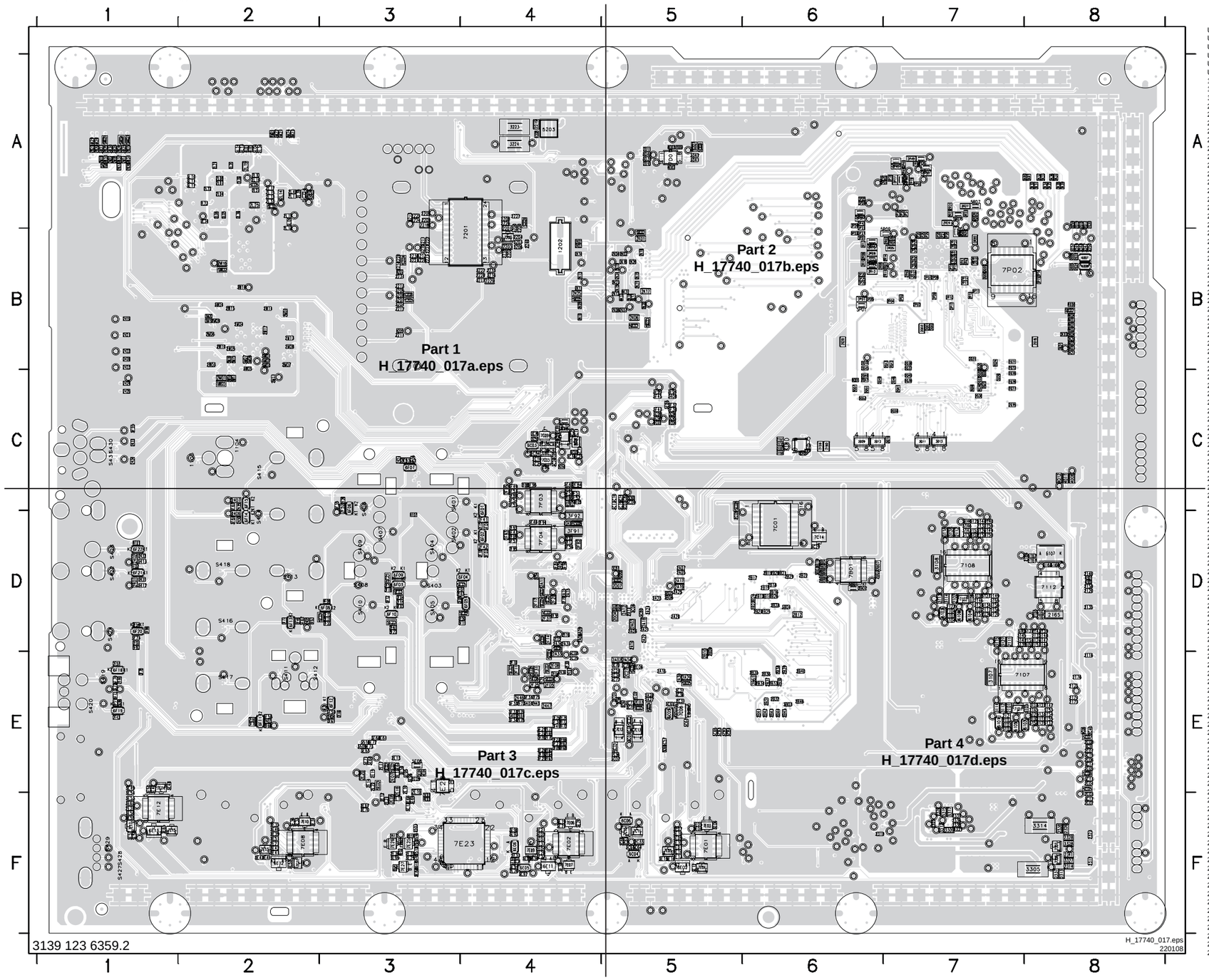
Layout Small Signal Board (Part 3 Top Side)



Layout Small Signal Board (Part 4 Top Side)



Layout Small Signal Board (Overview Bottom Side)



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U15	B4	2424	C1	2C37	E5	2F96	E1	2P27	B7	3124	D8	3C29	C4	3E65	F1	3K40	A8	5A05	E5	7B01	D6
U19	A1	2425	C1	2C40	E8	2F97	D1	2P28	B7	3125	D7	3C30	C4	3E66	F3	3K41	A8	5A06	D4	7C01	D6
U21	F6	2427	C2	2D02	D5	2F99	E1	2P29	B7	3126	D7	3C31	E8	3E67	F3	3L04	A2	5B01	D6	7C03	C4
U23	A8	2430	D2	2D03	D5	2K01	B5	2P30	B7	3127	D7	3C36	E5	3E68	E3	3L09	A2	5C03	E4	7C04	C4
U25	F2	2431	D1	2D04	D5	2K02	B5	2P31	B7	3128	D7	3C37	E5	3E69	F3	3L10	A2	5C05	E8	7C05	C4
1103	C2	2432	D1	2D06	D5	2K03	B4	2P32	B7	3129	E8	3C54	D4	3E70	F3	3L11	A2	5C06	E8	7C08	E5
1104	C2	2433	C1	2D07	D5	2K04	B5	2P33	B7	3130	E8	3C55	C4	3E71	E3	3L12	A2	5C07	E8	7C09	C4
1202	B4	2434	C1	2D09	A5	2K05	B4	2P34	B7	3131	D7	3C57	E5	3E72	E3	3L13	A2	5C08	C5	7C10	F5
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2102	D7	2436	E4	2D11	A5	2K07	B5	2P36	B7	3133	E8	3C60	C5	3E88	F3	3M01	B2	5C11	E5	7C12	E5
2103	E7	2443	E4	2D17	A8	2K08	B5	2P37	A6	3134	D7	3C61	E5	3E89	F4	3M02	B2	5C12	E5	7C13	E5
2104	D7	2444	E4	2D18	A8	2K09	B4	2P38	A7	3135	D7	3C62	E5	3E90	F4	3M03	B2	5D02	D5	7C14	D6
2111	D7	2446	E4	2D19	A8	2K10	B4	2P39	A7	3136	D7	3C63	F5	3E92	F4	3M04	B2	5D03	A5	7D01	A5
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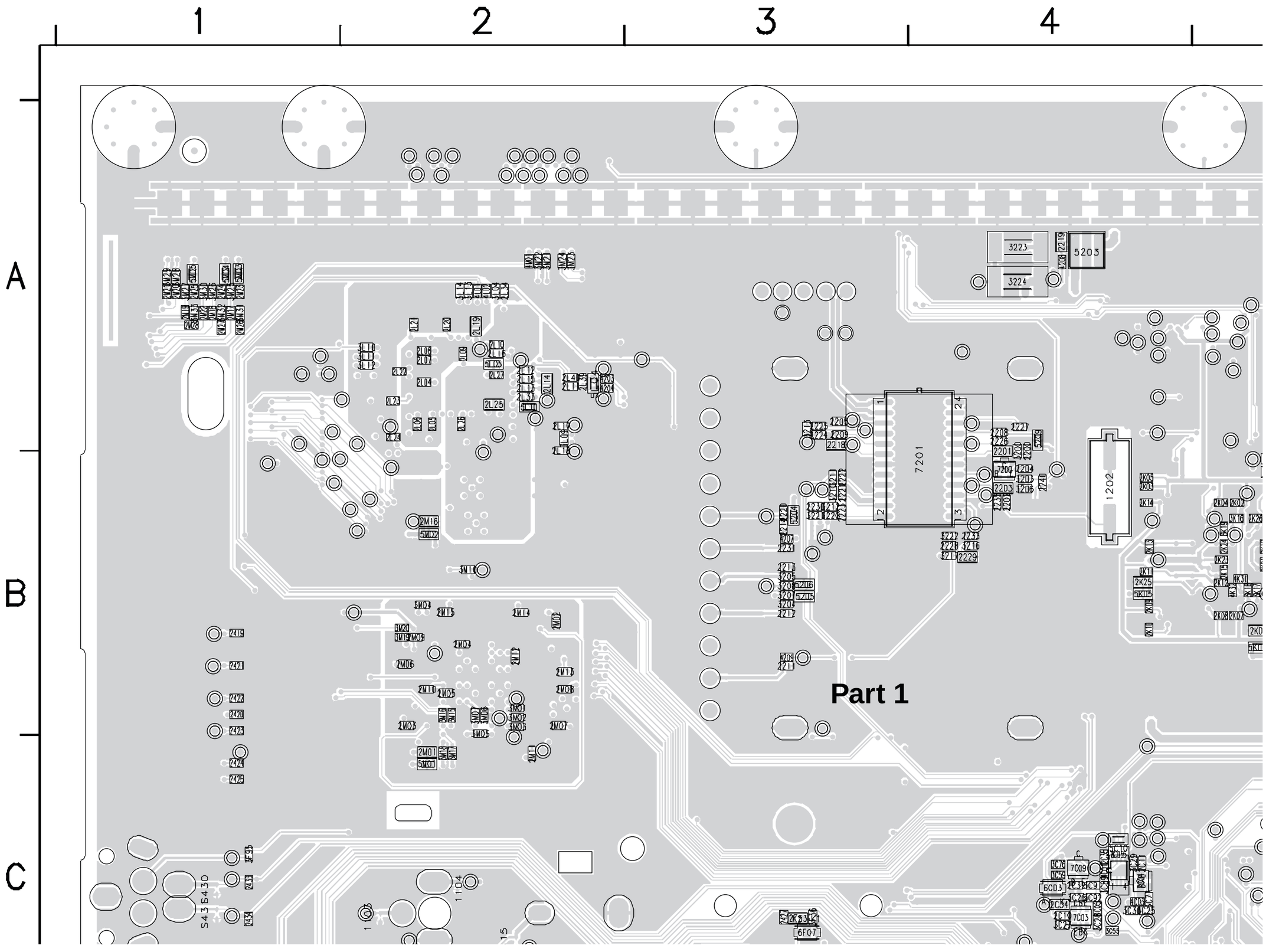
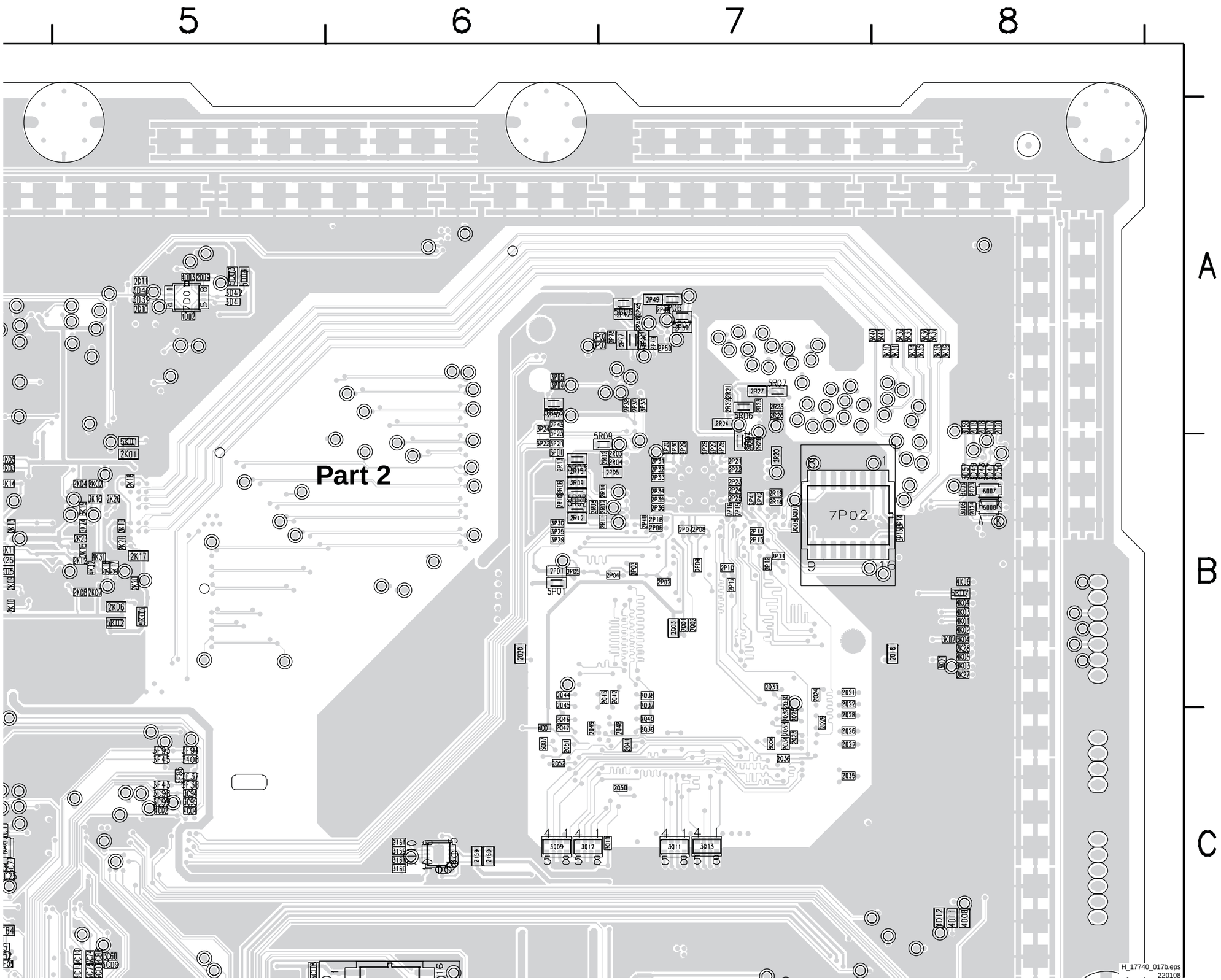
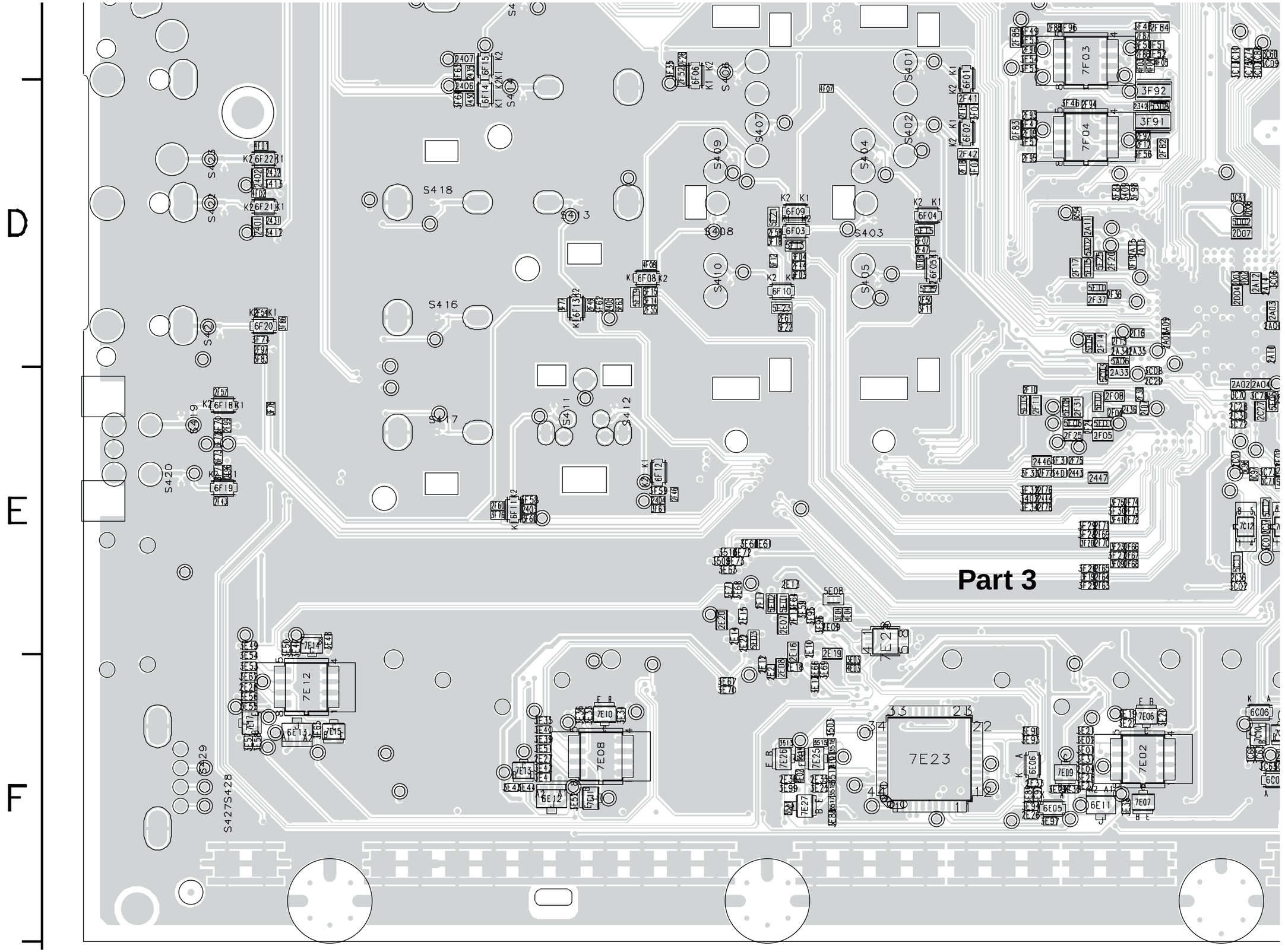
Layout Small Signal Board (Part 1 Bottom Side)



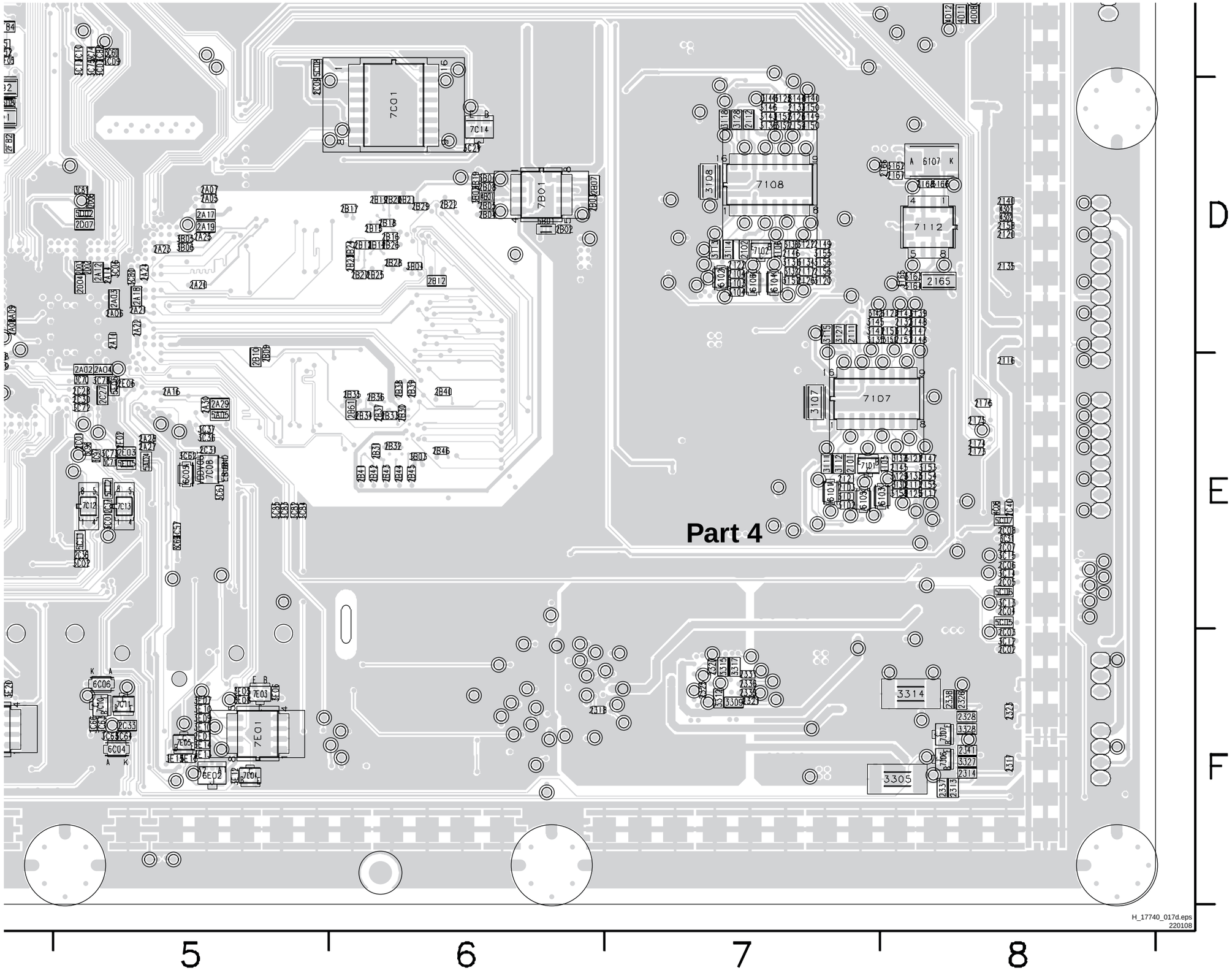
Layout Small Signal Board (Part 2 Bottom Side)



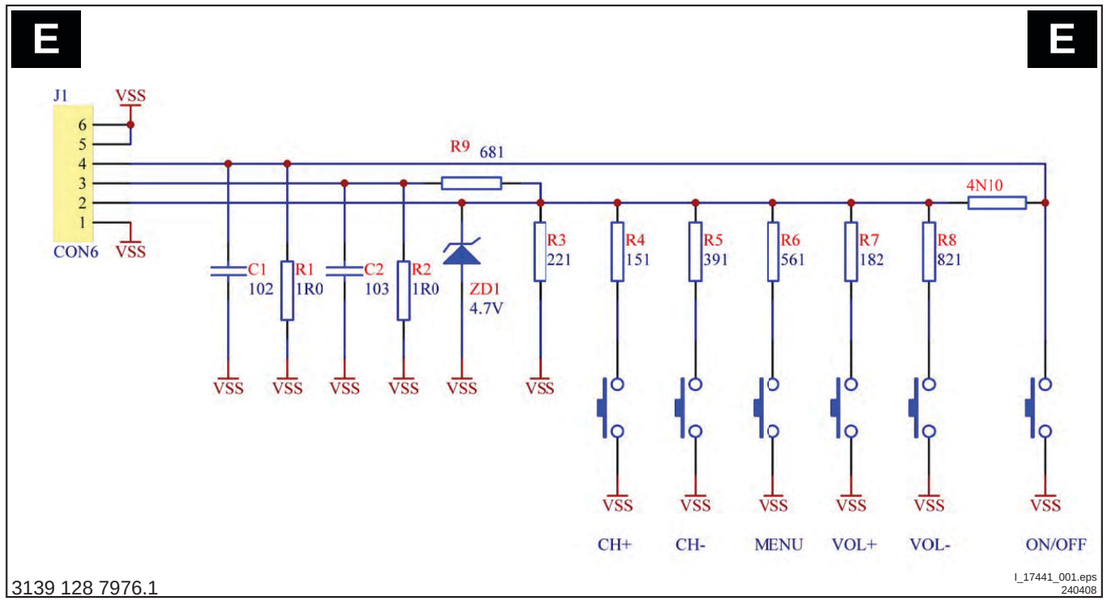
Layout Small Signal Board (Part 3 Bottom Side)



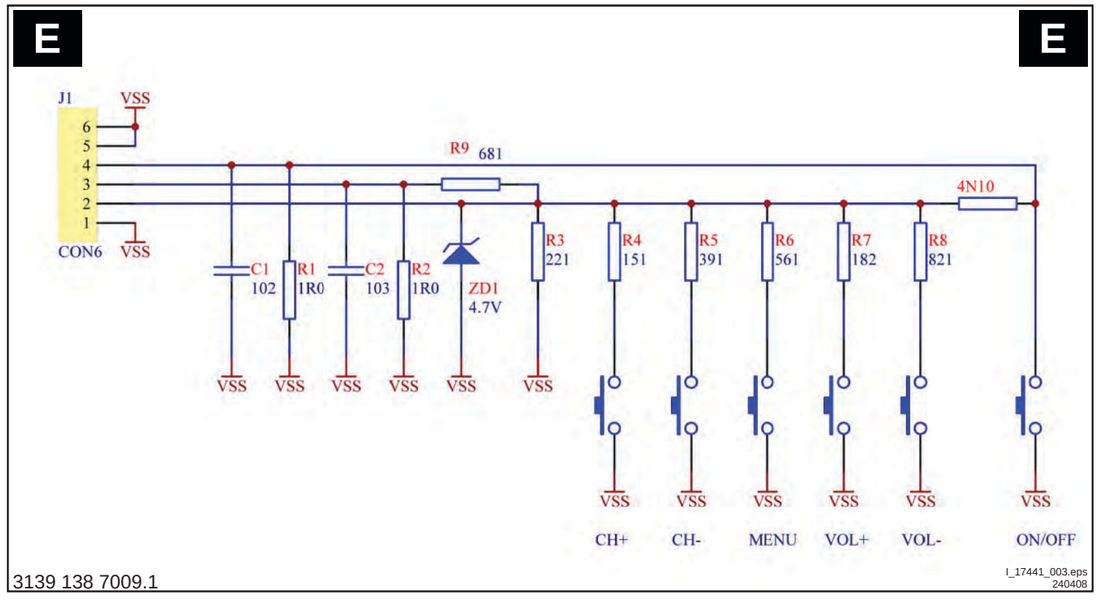
Layout Small Signal Board (Part 4 Bottom Side)



Keyboard Control Panel



Keyboard Control Panel



Layout Keyboard Control Panel

Obxerse copper layer

Obxerse character layer

Inverse copper layer

Inverse character layer

3139 128 7976.1

I_17441_002.eps
240408

Layout Keyboard Control Panel

Obxerse copper layer

Obxerse character layer

Inverse copper layer

Inverse character layer

3139 138 7009.1

I_17441_004.eps
240408

IR & LED Panel

IR & LED PANEL

TO ME8 LIGHT GUIDE
1P09
BM03B-SRSS-TBT
RES
+3V3STBY

"WHITE"
+5V_SW
3P11 1K8
IP10
6P11
19-113/T7D-CS2T2B2-3T

3P13 270R
3P12 270R
IP22
RES
TSML1020
6P12
SAME LOCATION WITH 7012

"RED"
+3V3STBY
3P10 1K8
IP11
6P10
SML-512

TO ME8 SSB
1P10
BM09B-SRSS-TBT
FP10
FP20
FP11
FP12
FP13
FP14
FP15
FP16
FP17
+3V3STBY
+5V_SW
LIGHT_SENSOR
IR
LED2
LED1
KEYBOARD
TACT_SWITCH_INT

IP12
4P01 RES
4P02 (RES FOR BDS)
IP13
LED1
3P15 10K
IP14
7P11 BC847BW
3P27 10K
IP15
7P10 BC847BW
3P14 10K
3P28 10K
LED2

FROM ME8 KEYB
1P11
BM04B-SRSS-TBT
+3V3STBY
FP18
+3V3STBY +3V3STBY
3P08 680R RES
3P07 680R RES
KEYBOARD
TACT_SWITCH_INT

IR
LIGHT_SENSOR

"IR RECEIVER"
7P14
GP1UE260RKVF
VS
OUT
GND
+3V3STBY
3P16 100R
IP16
3P19 6K8
2P10 10u
IP20
3P17 100R
3P23 100K

+5V_SW
3P09 10K RES
2P11 10u
2P12 10u
2P13 10u
3P25 33K
3P20 10K
IP19
3P24 10K

+5V_SW
7P13 BC847BW
IP17

"LIGHT SENSOR"
+5V_SW +5V_SW
7P12
TEMT6000X01
3P18 100K
IP18
3P21 150K
IP21
3P26 150K
3P22 10K

3139 123 6327.3
H_17650_053.eps
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1P09 A1
1P10 B1
1P11 C1
2P10 E5
2P11 E5
2P12 E6
2P13 E6
3P07 C3
3P08 C2
3P09 D6
3P10 A7
3P11 A5
3P12 A6
3P13 A6
3P14 B6
3P15 B4
3P16 D4
3P17 E5
3P18 D8
3P19 E4
3P20 E6
3P21 E8
3P22 E8
3P23 E4
3P24 E7
3P25 E6
3P26 E8
3P27 B5
3P28 B6
4P01 B5
4P02 B6
6P10 A7
6P11 A5
6P12 A6
7P10 B7
7P11 B5
7P12 D8
7P13 E7
7P14 E3
FP10 B1
FP11 B1
FP12 B1
FP13 B1
FP14 B1
FP15 B1
FP16 B1
FP17 B1
FP18 C1
FP20 B1
IP10 A5
IP11 A7
IP12 B5
IP13 B7
IP14 B4
IP15 B6
IP16 D5
IP17 E7
IP18 E8
IP19 E7
IP20 E4
IP21 E8
IP22 A6

Layout IR & LED Panel (Top Side)

2P10 A4
2P11 A6
3P07 A4
3P08 A4
3P09 A6
3P10 A3
3P11 A2
3P12 A6
3P13 A6
3P14 A2
3P15 A2
3P16 A4
3P17 A5
3P18 A6
3P19 A4
3P20 A6
3P21 A6
3P22 A6
3P23 A4
3P24 A6
3P25 A6
3P26 A6
3P27 A2
3P28 A3
4P01 A2
4P02 A2
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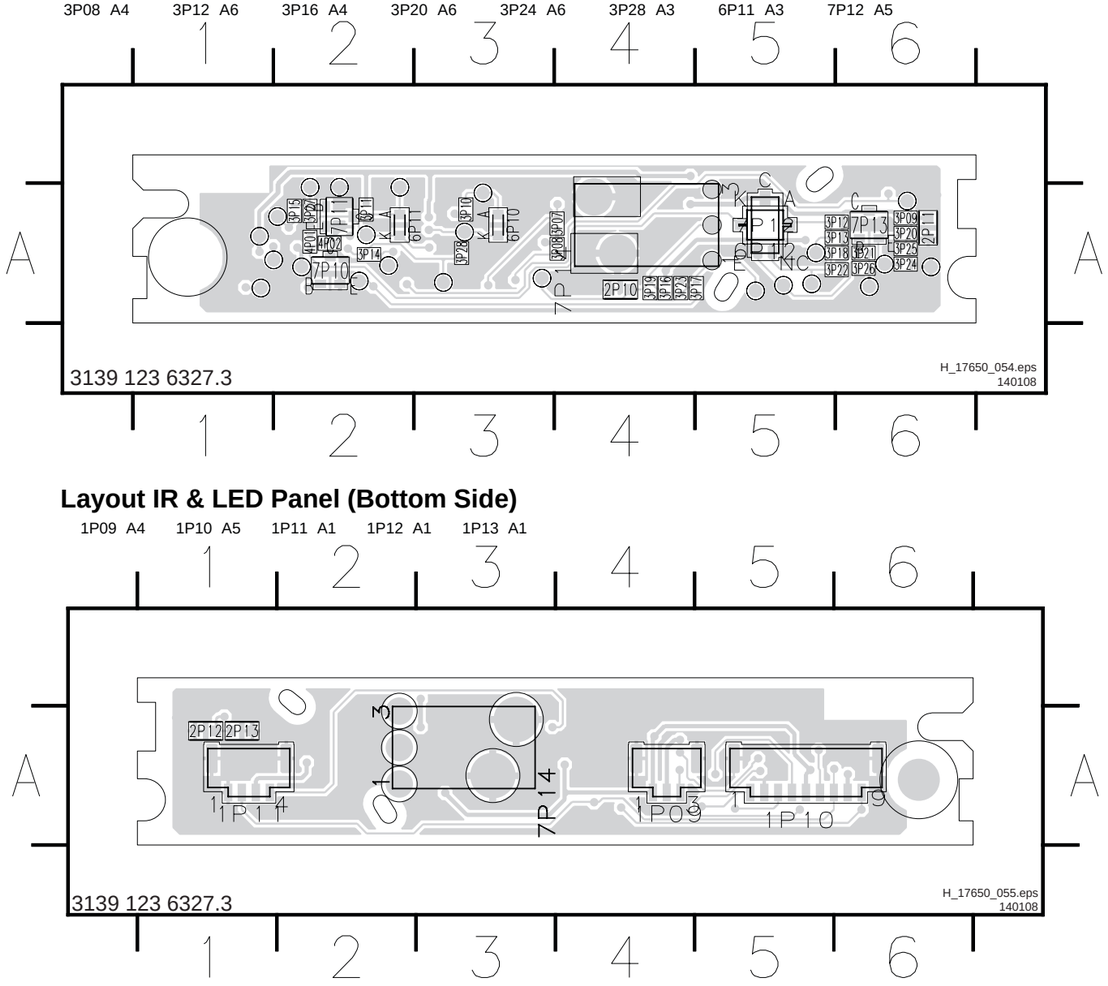
6P11 A3
6P12 A5
7P10 A2
7P11 A2
7P12 A5
7P13 A6
7P14 A4



Layout IR & LED Panel (Bottom Side)

1P09 A4
1P10 A5
1P11 A1
1P12 A1
1P13 A1

Personal Notes:

E_06532_012.eps
131004

Personal Notes:

E_06532_013.eps
131004

8. Alignments

Index of this chapter:

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

General: The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT or RIGHT keys of the remote control transmitter.

8.1 General Alignment Conditions

Perform all electrical adjustments under the following conditions:
- Power supply voltage (depends on region):
  - AP-NTSC: 120 V_{AC} or 230 V_{AC} / 50 Hz (± 10%).
  - AP-PAL-multi: 120 - 230 V_{AC} / 50 Hz (± 10%).
  - EU: 230 V_{AC} / 50 Hz (± 10%).
  - LATAM-NTSC: 120 - 230 V_{AC} / 50 Hz (± 10%).
  - US: 120 V_{AC} / 60 Hz (± 10%).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 15 minutes.
- Measure voltages and waveforms in relation to correct ground (e.g. measure audio signals in relation to AUDIO_GND).
  Caution: It is not allowed to use heatsinks as ground.
- Test probe: Ri > 10 Mohm, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

8.2 Hardware Alignments

There are no hardware alignments foreseen for this chassis.

8.3 Software Alignments

With the software alignments of the Service Alignment Mode (SAM), the RGB alignments can be performed:
- white tone (warm, normal, cool)
- black level offset

8.3.1 RGB Alignment

Before alignment, in customer menu, choose “Movie” as predefined picture and sound setting (“Auto Mode” button on RC). Also in customer menu “TV menu” > “TV settings” > “Picture”, set
- “Active Control” to “Off”
- “Color Enhancement” to “Off”
- “Dynamic Contrast” to “Off”
- “DNR” to “Off”.

White Tone Alignment:
- Activate SAM
- Select “RGB Align”
- Use a 75% white screen (Fluke 54200) or “Flat73” (Quantum Data 802BT) as input signal and set the following values:
  - All “R/G/B Gain” values initial to “128” (maximum).
  - All “R/G/B Offset” values (blacklevel) to “0”.

In case you have a color analyzer:
- Measure with a calibrated (phosphor- independent) color analyzer (e.g. Minolta CA-210) in the centre of the screen. Consequently, the measurement needs to be done in a dark environment.
- Adjust the correct x,y coordinates (while holding one of the White point registers R, G or B on “128”) by means of decreasing the value of one or two other white points to the correct x,y coordinates (see table “White D alignment values”). Tolerance: dx: ± 0.004, dy: ± 0.004.
- Repeat this step for the other color Temperatures that need to be aligned.
- Select “Store” in the “RGB Align” menu to store the aligned values to the NVM.

Table 8-1 White D alignment values

Value	Cool (11500 K)	Normal (9000 K)	Warm (6500 K)
x	0.276	0.289	0.314
y	0.277	0.291	0.319

If you do **not** have a color analyzer, you can use the default values. This is the next best solution. The default values are average values coming from production (statistics).
- Set the “R/G/B Gain” default values per temperature according to the values in the “Tint settings” table.
- Select “Store” in the “RGB Align” menu to store the aligned values to the NVM.

Table 8-2 Tint settings (default values)

Alignment	32"	42"	47"	52”
WARM_RED	127	127	127	127
WARM_GREEN	73	98	96	88
WARM_BLUE	61	96	86	59
NORMAL_RED	127	123	127	127
NORMAL_GREEN	81	117	105	96
NORMAL_BLUE	94	123	120	90
COOL_RED	127	99	115	126
COOL_GREEN	87	99	103	99
COOL_BLUE	115	127	127	110

Black Level Offset Alignment
- Activate SAM.
- Select “RGB Align” and choose a temperature.
- For each temperature, the “R/G/B Offset” value should be set to “0”.
- Select “Store” in the “RGB Align” menu to store the aligned values to the NVM.

8.4 Option Settings

8.4.1 Introduction

The microprocessor communicates with a large number of I^2C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence/absence of these specific ICs (or functions) is made known by the option codes.

Notes:
- After changing the option(s), save them with the “Store” command.
- The new option setting becomes active after the TV is switched "off" and "on" again with the mains switch (the NVM is then read again).

8.4.2 How To Set Option Codes

When the NVM is replaced, all options will require resetting. To be certain that the factory settings are reproduced exactly, you must set all option numbers. You can find the correct option numbers in table “Option Codes OP1...OP10“ below.

How to Change Options Codes
An option code (or “option byte”) represents eight different options (bits). When you change these numbers directly, you can set all options very quickly. All options are controlled via ten option bytes (OP1... OPA).
Activate SAM and select “Options”. Now you can select the option byte (OP#1.. OP#A) with the CURSOR UP/ DOWN keys, and enter the new 3 digit (decimal) value. For the correct factory default settings, see the next table “Option code overview“. For more detailed information, see the next tables “Option codes at bit level“. If an option is set (value “1”), it represents a certain decimal value.
When all the correct options (bits) are set, the sum of the decimal values of each Option Byte (OP) will give the option code.

Table 8-3 Option code overview

CTN/Model nr.	Option Code	Display (Code)
32PFL3403D/85	065 123 094 248 006 106 000 000 000 004	LC320WXN (136)
32PFL5403D/27	065 123 094 248 006 106 000 000 000 004	LC320WXN (136)
32PFL5413D/85	065 123 094 248 006 106 000 000 000 004	LC320WXN (136)
42MF438B/27	064 091 086 248 006 002 000 000 000 002	LC420WUE (130)
42PFL3403D/27	065 123 094 248 006 106 000 000 000 002	LC420WXE (138)
42PFL3603D/27	065 123 094 248 006 106 000 000 000 002	LC420WUE (130)
42PFL5403D/85	065 123 094 248 006 106 000 000 000 000	LC420WXE (138)
42PFL5603D/27	195 123 094 248 006 106 000 000 000 000	LC420WUE (130)
42PFL7403D/27	201 123 094 248 006 106 000 000 000 001	LC420WUF (142)
42PFL7603D/27	233 123 094 248 006 122 000 000 000 001	LC420WUF (142)
42TA648BX/37	065 123 094 248 006 106 000 000 000 000	LC420WUE (130)
47MF438B/27	064 091 086 248 006 002 000 000 000 002	LC470WUE (135)
47PFL3603D/27	065 123 094 248 006 106 000 000 000 002	LC470WUE (135)
47PFL5603D/27	195 123 094 248 006 106 000 000 000 000	LC470WUE (135)
47PFL7403D/27	201 123 094 248 006 106 000 000 000 001	LC470WUF (137)
47PFL7603D/27	233 123 094 248 006 122 000 000 000 001	LC470WUF (137)
47TA648BX/37	065 123 094 248 006 106 000 000 000 000	LC470WUE (135)
52MF438B/27	064 091 086 248 006 002 000 000 000 002	LK520D3LZ83 (158)
52PFL3603D/27	065 123 094 248 006 106 000 000 000 002	LK520D3LZ83 (158)
52PFL5603D/27	195 123 094 248 006 106 000 000 000 000	LK520D3LZ83 (158)
52PFL7403D/27	201 123 094 248 006 106 000 000 000 001	LK520D3LZ93 (151)
52PFL7603D/27	233 123 094 248 006 122 000 000 000 001	LK520D3LZ93 (151)
52TA648BX/37	065 123 094 248 006 106 000 000 000 000	LK520D3LZ83 (158)

Option Bit Overview
Below find an overview of the Option Codes on **bit** level.

Table 8-4 Option codes at bit level (OP1-OP4)

Option Byte & Bit	Dec. Value	Option Name	Description
Byte OP1			
Bit 7 (MSB)	128	OPC_MT8280	ON = MT8280 is available OFF = MT8280 is not available, i.e. DFI is used in case 120Hz (MJC) is enabled
Bit 6	64	OPC_VIRGIN_MODE	ON = Virgin Mode (PNP) is available OFF = Virgin Mode (PNP) is not available
Bit 5	32	OPC_AMBILIGHT_2	0 = AmbiLight is not available 1 = Mono AmbiLight is available 2 = Stereo AmbiLight is available 3 = Reserved
Bit 4	16	OPC_AMBILIGHT	
Bit 3	8	OPC_MJC_120HZ_2	0 = MJC (120Hz) is not available 1 = MJC (120Hz) for 768p is available (OP11 must ON too) 2 = MJC (120Hz) for 1080p is available (OP11 must ON too) 3 = Reserved
Bit 2	4	OPC_MJC_120HZ	
Bit 1	2	OPC_MJC_60HZ	ON = MJC (60Hz) is available OFF = MJC (60Hz) is not available
Bit 0 (LSB)	1	OPC_PHILIPS	ON = Philips set OFF = Magnavox set
Byte OP2			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	OPC_SHOP_MODE	ON = Shop mode is available OFF = Shop mode is not available
Bit 5	32	OPC_LIGHT_SENSOR	ON = Light Sensor is available (ActiveControl= OFF, ON, ON w Light sensor) OFF = Light Sensor is not available (ActiveControl= OFF, ON)
Bit 4	16	OPC_BACKLIGHT_BOOST	ON = Backlight boosting is available OFF = Backlight boosting is not available
Bit 3	8	OPC_BACKLIGHT_DIMMING	ON = Backlight Dimming is available OFF = Backlight Dimming is not available
Bit 2	4	Reserved	Not Used (Reserved)
Bit 1	2	OPC_BBD	ON = Black Bar Detection is available OFF = Black Bar Detection is not available
Bit 0 (LSB)	1	OPC_WIDE_SCREEN	ON = TV is 16x9 set OFF = TV is 4x3 set (Provision)
Byte OP3			
Bit 7 (MSB)	128	OPC_HDMI_EASY	ON = HDMI Easy is available (Provision) OFF = HDMI Easy is not available (Provision)
Bit 6	64	OPC_CEC	ON = CEC is available OFF = CEC is not available
Bit 5	32	OPC_EPG	ON = EPG is available (Provision) OFF = EPG is not available (Provision)
Bit 4	16	OPC_VCHIP	ON = VChip is available (Provision) OFF = VChip is not available (Provision)
Bit 3	8	OPC_VIEW_FOR_YOU	ON = View for you feature is available OFF = View for you feature is not available
Bit 2	4	OPC_STEREO_DBX	ON = Stereo DBX detection is available (Provision) OFF = Stereo DBX detection is not available (Provision)
Bit 1	2	OPC_LIP_SYNC	ON = Lip Sync is available OFF = Lip Sync is not available
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP4			
Bit 7 (MSB)	128	OPC_SideAV_SVHS	ON = SideAV SVHS is available OFF = SideAV SVHS is not available
Bit 6	64	OPC_SideAV_CVBS	ON = SideAV_CVBS is available OFF = SideAV_CVBS is not available
Bit 5	32	OPC_AV3_SVHS	ON = AV3_SVHS is available OFF = AV3_SVHS is not available
Bit 4	16	OPC_AV3_CVBS	ON = AV3_CVBS is available OFF = AV3_CVBS is not available
Bit 3	8	OPC_CVI2	ON = CVI2 is available OFF = CVI2 is not available
Bit 2	4	OPC_REGION_3	0 = NFATA 1 = EU, AP & LATAM 2 = Reserved 3 = Reserved 4 ~7 = Reserved
Bit 1	2	OPC_REGION_2	
Bit 0 (LSB)	1	OPC_REGION	

Table 8-5 Option codes at bit level (OP5-OPA)

Option Byte & Bit	Dec. Value	Option Name	Description
Byte OP5			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	OPC_HDMI5	ON = HDMI5 is available OFF = HDMI5 is not available
Bit 2	4	OPC_HDMI4	ON = HDMI4 is available OFF = HDMI4 is not available
Bit 1	2	OPC_HDMI3	ON = HDMI3 is available OFF = HDMI3 is not available
Bit 0 (LSB)	1	OPC_VGA	ON = VGA is available OFF = VGA is not available
Byte OP6			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	OPC_MULTIMEDIA_PLAYER	ON = MultiMedia feature(i.e. Photo viewer & MP3 player) is available OFF = MultiMedia feature(i.e. Photo viewer & MP3 player) is not available
Bit 5	32	OPC_ECO_VIEW_MODE_DEMO	ON = Eco view mode demo is available OFF = Eco view mode demo is not available
Bit 4	16	OPC_AMBILIGHT_DEMO	ON = Ambilight demo is available OFF = Ambilight demo is not available
Bit 3	8	OPC_SS_DEMO	ON = Split Screen Demo is available OFF = Split Screen is not available
Bit 2	4	OPC_MP_ALIGN	ON = Using multi-point alignment for Gamma & White point (Provision) OFF = Using old way for Gamma (pre-defined) & White point alignment (Provision)
Bit 1	2	OPC_SYS_RECVRY	ON = System Recovery is available OFF = System Recovery is not available
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP7			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	Reserved	Not Used (Reserved)
Bit 2	4	Reserved	Not Used (Reserved)
Bit 1	2	Reserved	Not Used (Reserved)
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP8			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	Reserved	Not Used (Reserved)
Bit 2	4	Reserved	Not Used (Reserved)
Bit 1	2	Reserved	Not Used (Reserved)
Bit 0 (LSB)	1	Reserved	Not Used (Reserved)
Byte OP9			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Reserved	Not Used (Reserved)
Bit 3	8	Tuner Profile_3	0 = US_ALPS TDQU 1 = Not Used (Reserved) 2 = Not Used (Reserved) 3 = Not Used (Reserved) 4 = Not Used (Reserved) 5 = Not Used (Reserved) 6 = Not Used (Reserved) 7 = Not Used (Reserved) 8 = Not Used (Reserved) 9 = Not Used (Reserved) 10 = Not Used (Reserved)
Bit 2	4	Tuner Profile_2	
Bit 1	2	Tuner Profile_1	
Bit 0 (LSB)	1	Tuner Profile_0	
Byte OPA			
Bit 7 (MSB)	128	Reserved	Not Used (Reserved)
Bit 6	64	Reserved	Not Used (Reserved)
Bit 5	32	Reserved	Not Used (Reserved)
Bit 4	16	Cabinet Profile_4	0 = Cabinet_Profile_0_42_ME8 1 = Cabinet_Profile_1_47_MAG8 2 = Cabinet_Profile_2_32_ME8 3 = Cabinet_Profile_3_Supernova 4 = Cabinet_Profile_4 5 = Cabinet_Profile_5 6 = Cabinet_Profile_6 7 = Cabinet_Profile_7 8 = Cabinet_Profile_8 9 = Cabinet_Profile_9 10
Bit 3	8	Cabinet Profile_3	
Bit 2	4	Cabinet Profile_2	
Bit 1	2	Cabinet Profile_1	
Bit 0 (LSB)	1	Cabinet Profile_0	

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

Notes:

- Only **new** circuits (circuits that are not published recently) are described.
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the Wiring, Block (chapter 6) and Circuit Diagrams (chapter 7). Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The LC8.1U chassis (development name “LC08SP”) is a newly developed platform using a “Mediatek” chipset. It covers screen sizes of 32" upto 52" with a new styling called “ME8” and “MG8”. The MG8 is like the ME8 styling, however instead of a transparent flare, it has a in-mould color flare. Also the speakers are front firing as i.o. back-firing, and it comes w/o tweeters. The back cover construction is 95% same as ME8.

Some key components are:

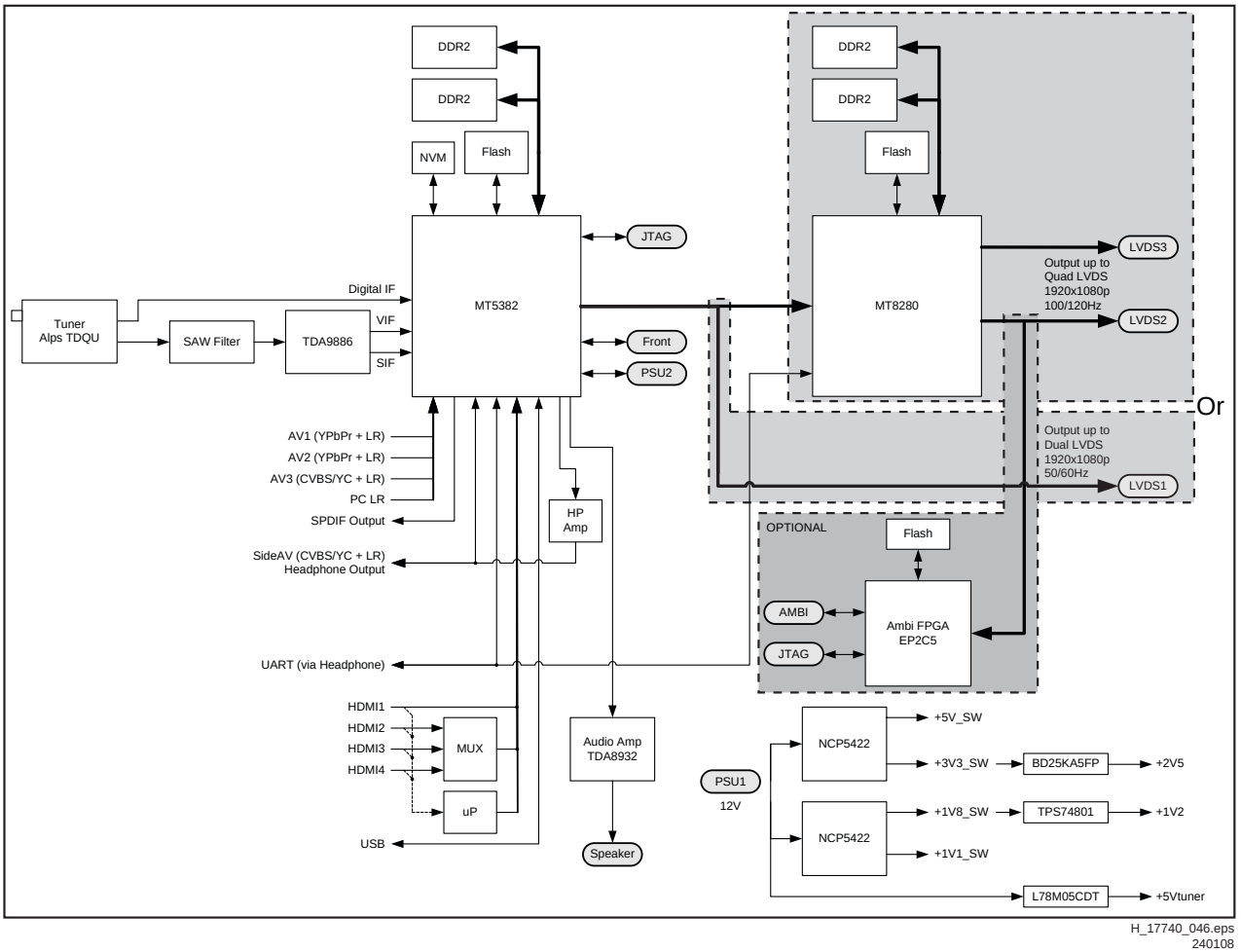
- Main processor (MT5382): audio/video processing.
- Motion estimation/compensation engine (MT8280) (in some sets).
- FPGA; I^2C output to AmbiLight modules (in some sets).
- HDMI demultiplexer (SIL9185) for driving 4 HDMI connectors.
- Standby controller (WT61P7) for overall power management.
- Analog IF-PLL demodulator (TDA9886).
- Audio class-D amplifier (TDA8932).

9.1.1 Features

- Hybrid NTSC/ATSC tuner.
- 3+1 HDMI v1.3, supporting CEC.
- USB 2.0.
- Digital Natural Motion (DNM) (in some sets).
- Double Frame Rate (120 Hz) (in some sets).
- 2-sided AmbiLight (in some sets).
- PSU directly drives the backlight units (no inverters needed).

9.1.2 LC08SP Architecture Overview

For details of the chassis block diagrams refer to chapter “Block diagrams, Test Point Overview, and Waveforms”. An overview of the LC08SP architecture can be found below.



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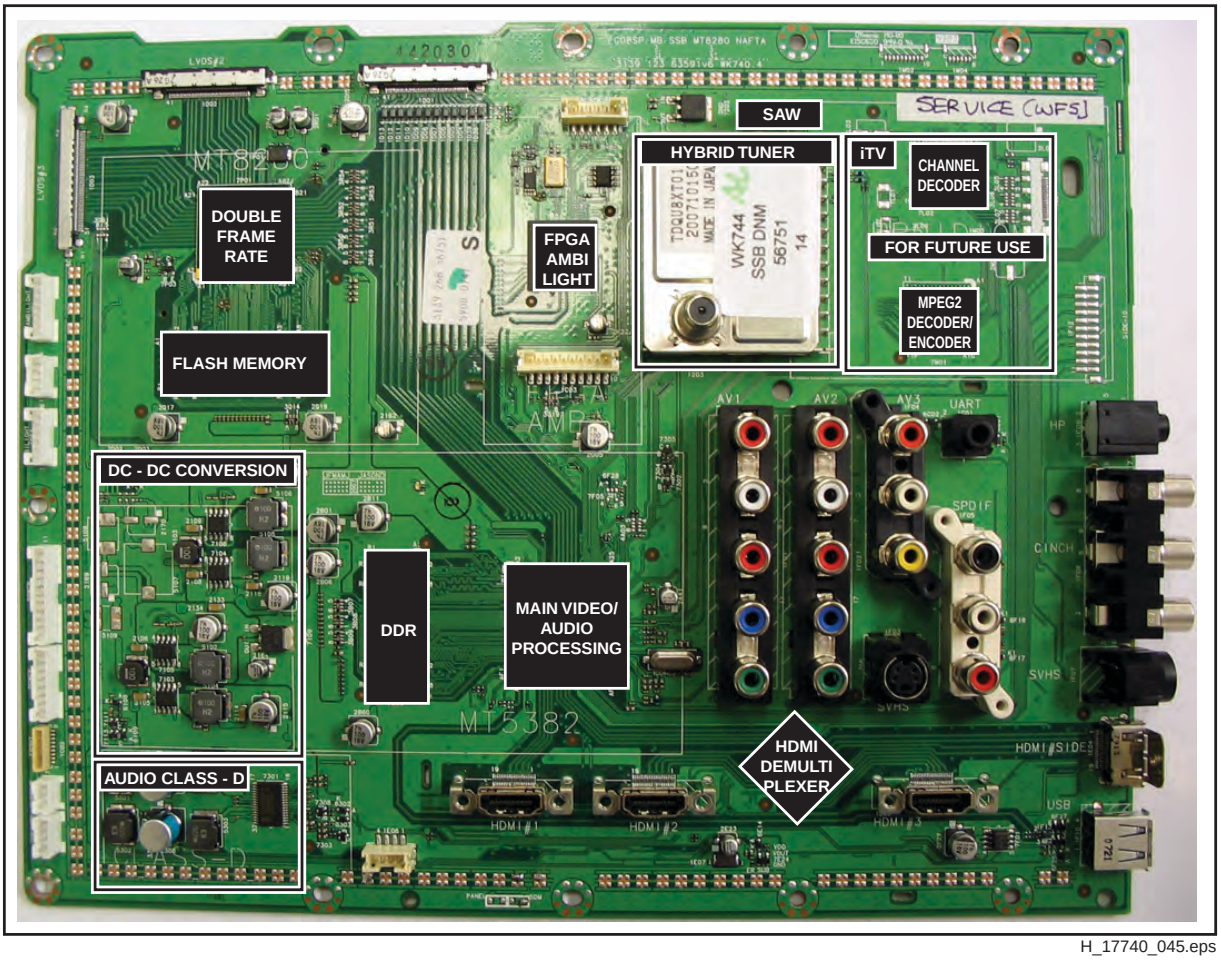
240108

Figure 9-1 Architecture of LC08SP

9.1.3 SSB Cell Layout



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250108

Figure 9-2 SSB top view

9.2 LCD Power Supply

The Power Supply Unit (PSU) in this chassis is a buy-in and is a black-box for Service. When defective, a new panel must be ordered and the defective panel must be returned for repair, unless the main fuse of the unit is broken. Always replace the fuse with one with the correct specifications! This part is commonly available in the regular market.

Different PSUs are used in this chassis:
- 32" sets use a “Delta” PSU (DPS-182CP A)
- 42" sets use an “LG” PSU (LGIT PLHL-T721A or -T720A)
- 47" sets use an “LG” PSU (LGIT PLHL-T722A)
- 52" sets use a “Delta” PSU (DPS-411AP A).

Some Power Supply Units deliver also the high voltage to drive the backlight of the LCD panel (then called IPB= Integrated Power Board). These LCD panels come therefore without inverters. In addition, all PSU’s deliver the following voltages to the chassis:
- High voltage to drive the backlight units (no inverters needed)
- $+3V3_{STBY}$ to SSB
- $+12\ V_{display}$ to SSB
- $+12\ V_{audio}$ and $-12\ V_{audio}$ to SSB
- +12 V to DC-DC converters to SSB
- +12 V to Bolt-on Supply (where applicable) to SSB
- +24 V to Bolt-on Supply (where applicable) to SSB.

9.3 DC/DC converters

On-board DC-DC converters convert the +12 V coming from the PSU and deliver the following voltages:
- +5 V (+$5V_{tuner}$)
- +5 V (+5V_SW)
- +3.3 V (+3V3_SW)
- +2.5 V (+2V5)
- +1.8 V (+1V8_SW)
- +1.1 V (+1V1_SW)
- +1.2 V (+1V2)

The power supply system consists on standby, switched, and regulated voltages. The Standby voltage, +3V3STBY, will be available once AC supply is provided to the system. As for the other voltages, namely switched and regulated voltages, these are available once STANDBY signal is pulled “low” to allow other supplies from the PSU to turn “on”. The switched supplies are generated from the main +12V supply, while the regulated supplies are derived from the switched supplies.

There are a number of detection circuits to detect the following supplies; +12V, +12Vdisp and +3V3_SW. The +12V is the main supply voltage from the PSU that enables the switched voltages to be generated. The +12Vdisp is the supply to the display timing controller, while the +3V3_SW is powering the microprocessor and its flash memory.

The following diagram shows the power supply architecture of the SSB:

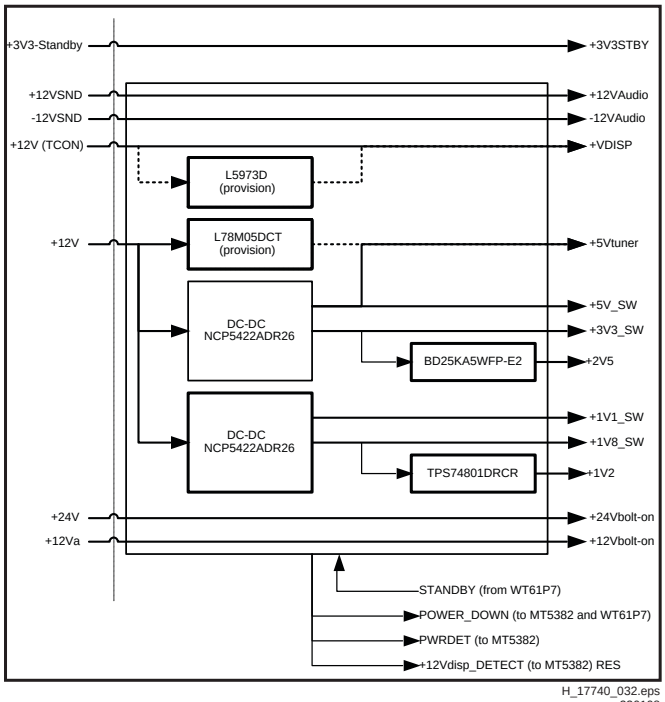

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Figure 9-3 Power Supply Architecture

Control Signal Functions:

- STANDBY: Control of PSU to enable switched supplies, active “low”, by Standby Controller WT61P7.
- POWER_DOWN: Signal to detect +12V presence, active “high”.
- PWRDET: Signal to detect +3V3_SW presence for MT5382 operation, ADC operation.
- +12Vdisp_DETECT: Signal to detect +12Vdisp presence, active “high”.

9.4 Front-End

All sets in this chassis use the “Alps TDQU” hybrid tuner. Refer to diagram B2 for details.

For analog reception, the signal from the tuner is processed by the MT5382 Main Processor via the M1971 SAW filter and TDA9886 Analog IF-PLL demodulator.

For digital reception, the signal from the tuner is processed directly by the MT5382 Main Processor.

In future ITV implementations, the MT5112 Channel Decoder and ProIdiom MPEG2 decoder/encoder will be added (not implemented in this chassis).

Refer to figure “Front-end implementation” for details.

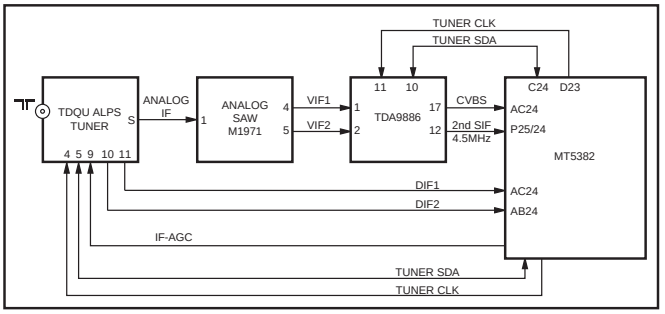

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Figure 9-4 Front-end implementation

9.5 Video Processing

Both audio and video signals are processed by the MT5382 audio/video processor. Refer to diagram B4 for details.

In basic sets (sets without DNM/AmbiLight), the video signal is fed directly to the panel via an LVDS connector. Refer to figure “Video processing - basic sets” for details.

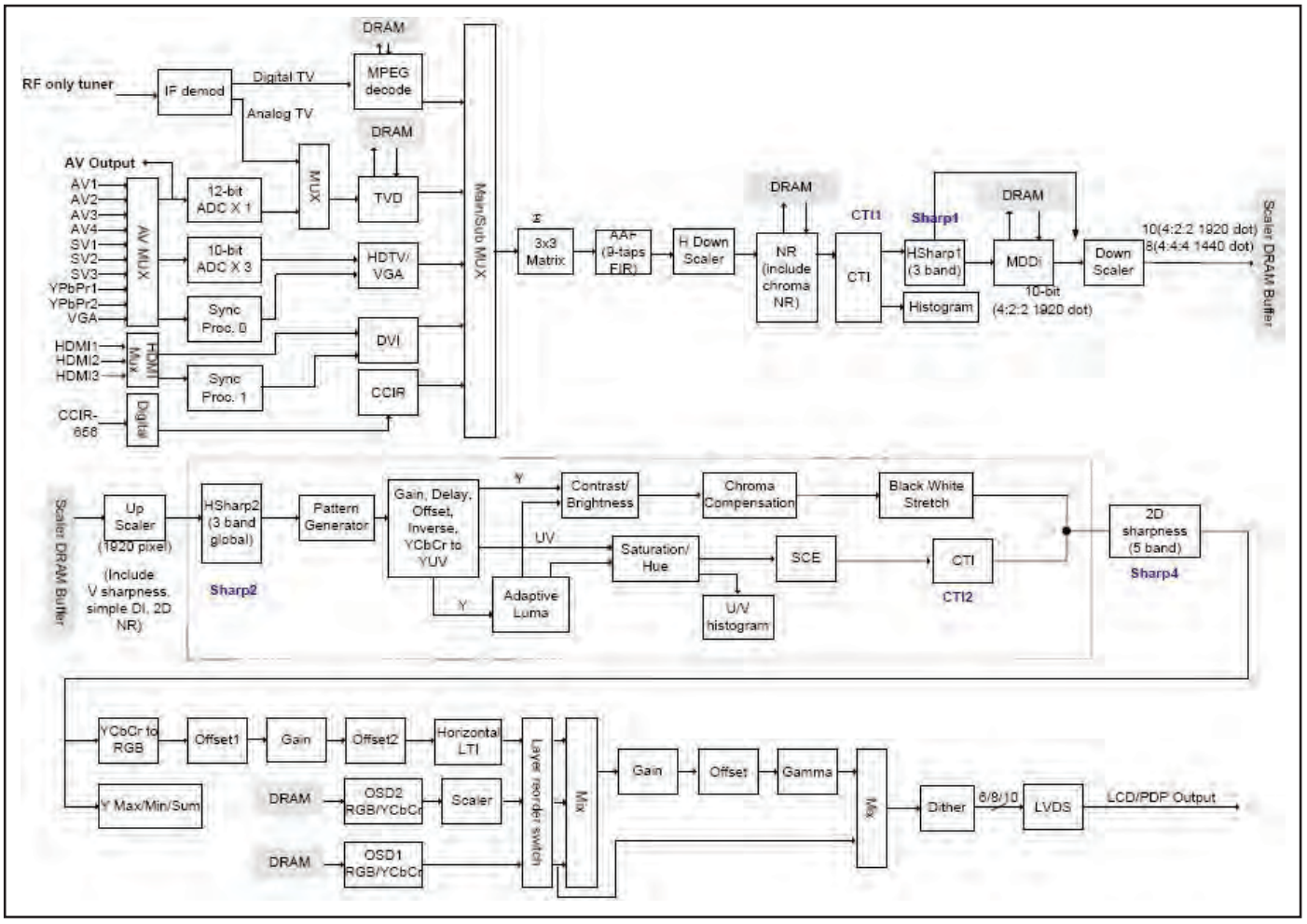

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Figure 9-5 Video processing - basic sets

In sets which support DNM/AmbiLight, the signal coming from the MT5382 audio/video processor is fed to the MT8280 motion engine with double frame rate output (120 Hz). Refer to diagram B5R and figure “Video processing - DNM+AmbiLight using MT8280 Motion Engine)” for details.

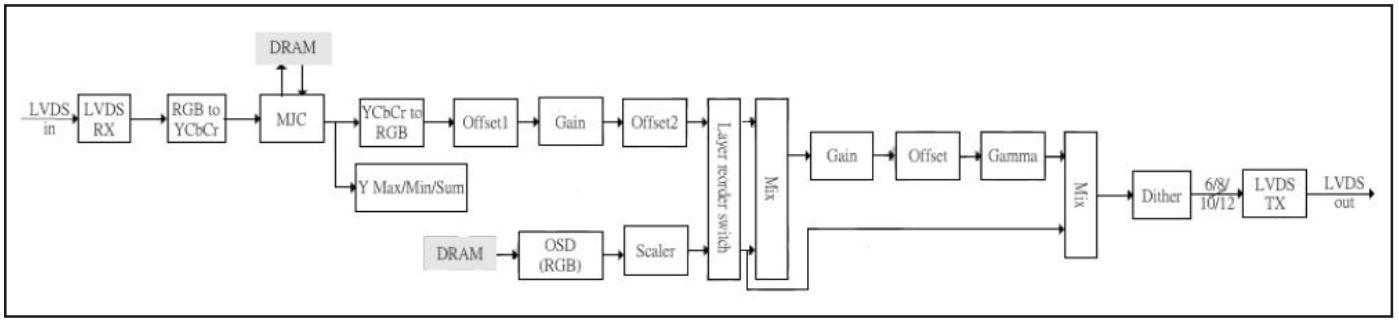

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Figure 9-6 Video processing - DNM+AmbiLight using MT8280 Motion Engine

9.6 Audio Processing

Both audio and video signals are processed by the MT5382 audio/video processor. Refer to diagram B4 for details.

For the audio processing inside the audio/video processor, refer to figure “Functional blocks audio processing MT5382 audio/video processor” for details.

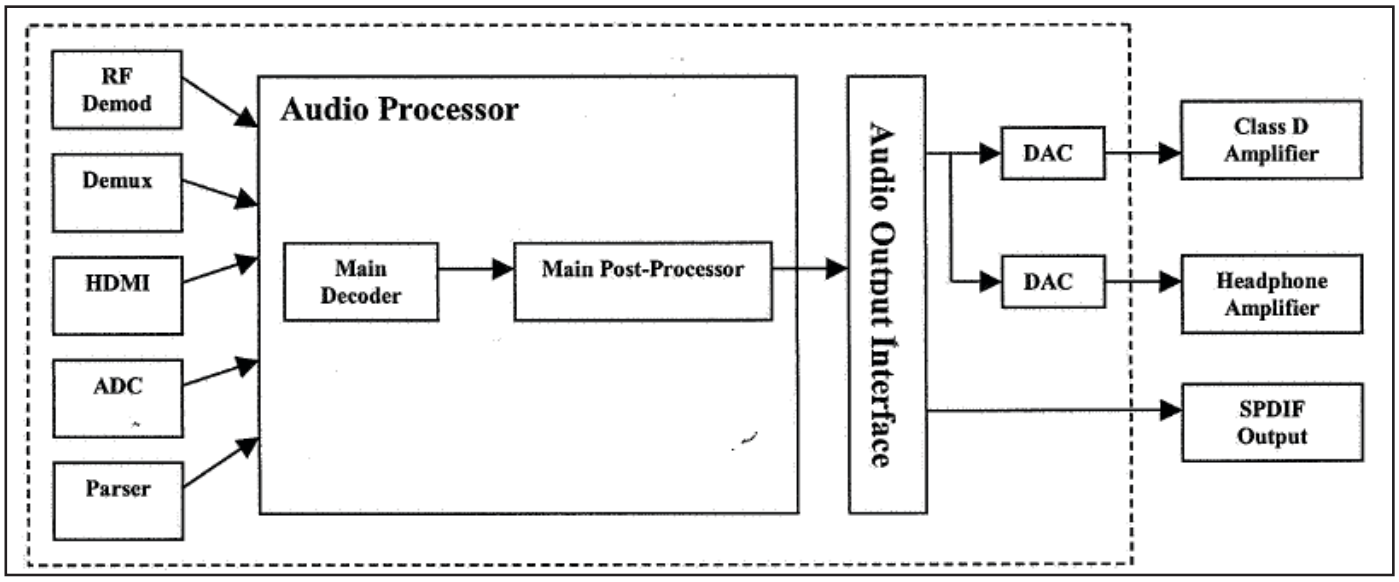

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Figure 9-7 Functional blocks audio processing MT5382 audio/video processing

For the implementation of the MT5382 audio/video processor for audio processing, refer to figure “Audio processing”.

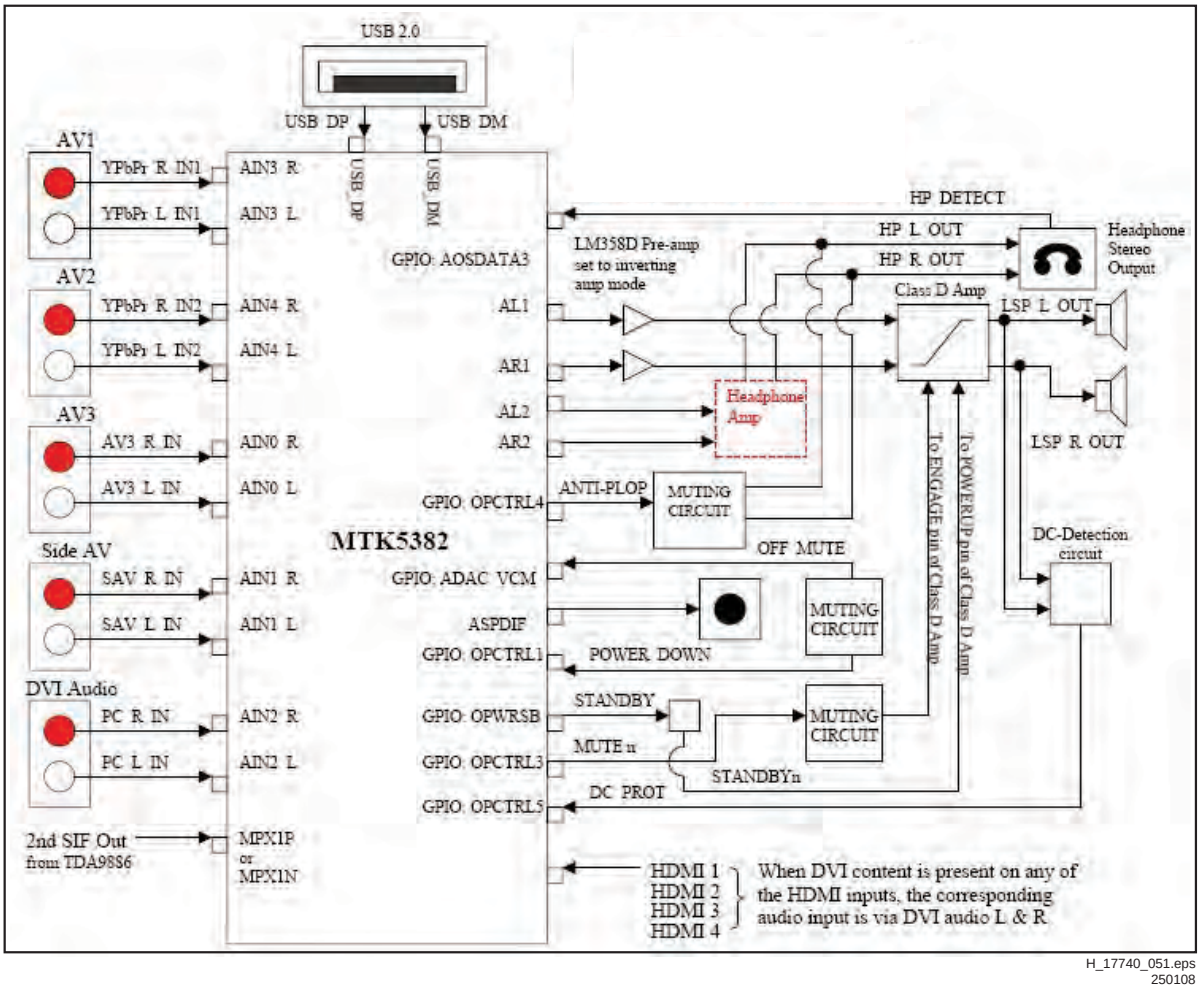

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Figure 9-8 Audio processing

9.7 HDMI

The MT5382 audio/video processor has three built-in HDMI receivers. An external HDMI switch (SIL 9185) has been added to support a 4th HDMI connector.

The HDMI implementation supports CEC. The standby controller WT61P7 ensures CEC is also supported when set is in standby mode. Refer to figure “HDMI implementation” for details.

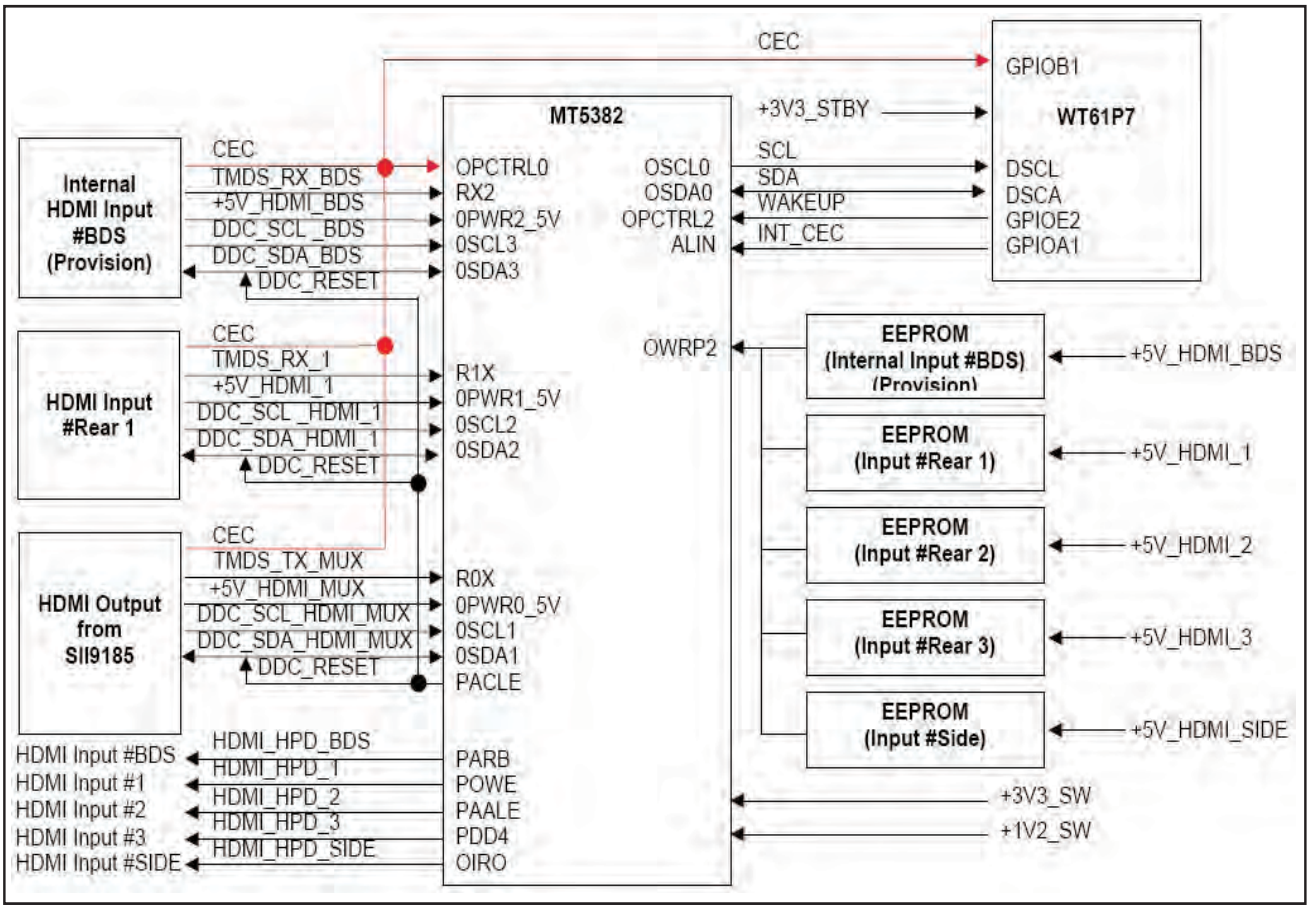

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Figure 9-9 HDMI implementation

Note: if on one of the HDMI inputs a DVI signal is connected, the analog audio inputs near the HDMI3 connector are automatically selected as audio input source.

For the connector pin assignments, refer to the Wiring Diagram in chapter 6 “Block Diagrams, Test Points, and Waveforms”.

9.8 AmbiLight (when present)

The AmbiLight units are located in the back cover. Refer to figure “AmbiLight implementation” for details.

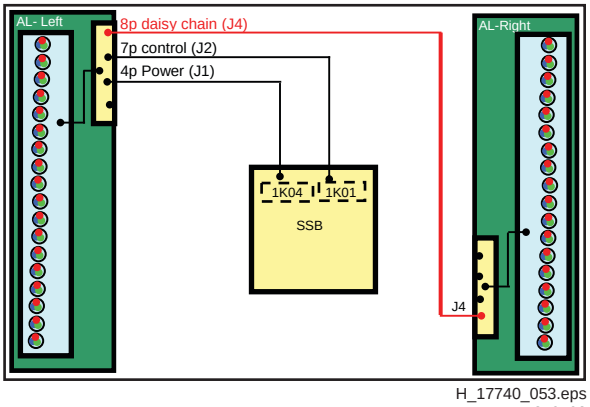

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Figure 9-10 AmbiLight implementation

9.9 Control Signal Description

The following diagram gives an overview of the control signal flow for the LC08SP platform.

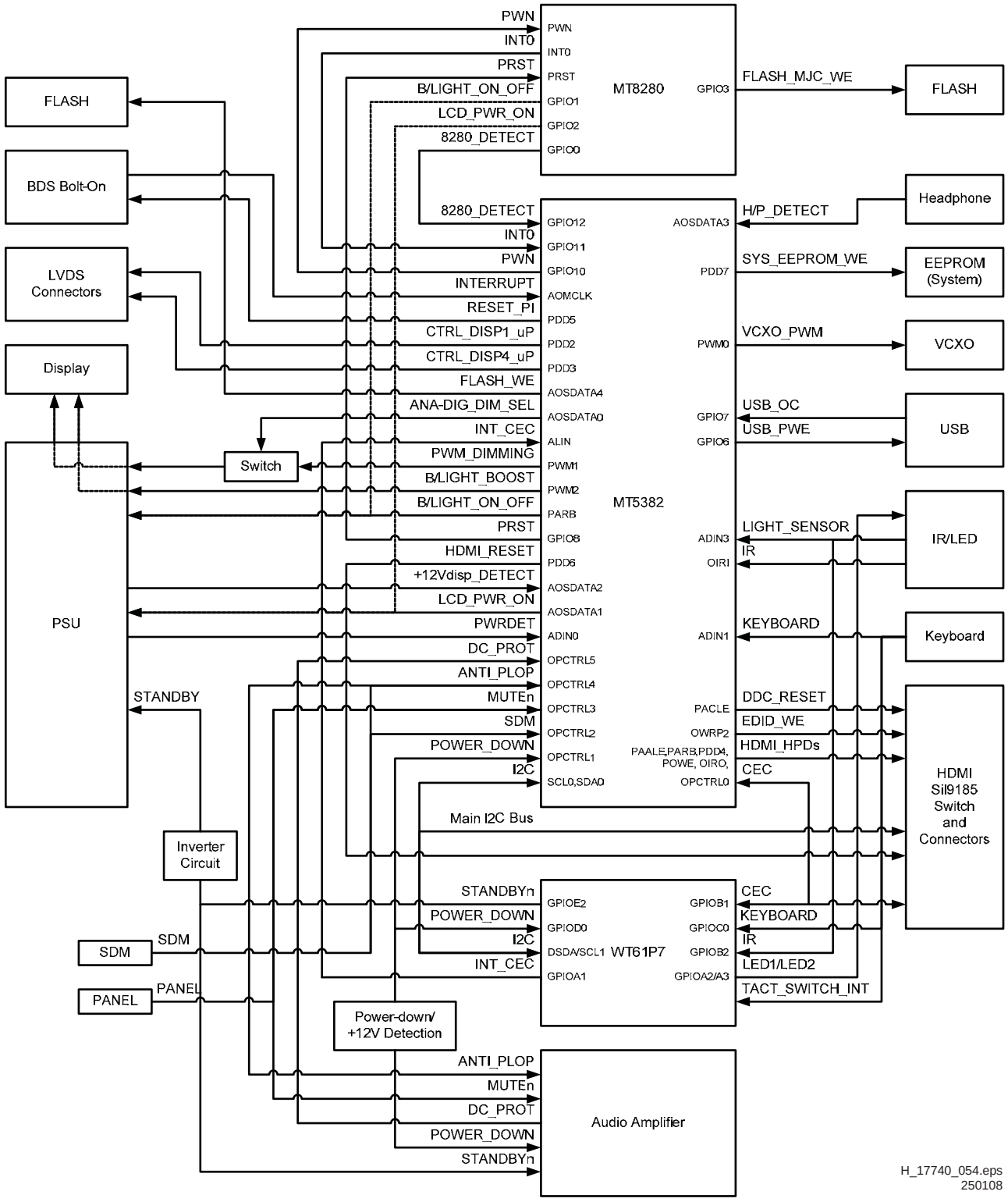


Figure 9-11 Control Signal flow diagram

The following GPIO table can be used for quick reference:

Table 9-1 GPIO Reference Table

Device	Pin	Symbol	Function	Reference	Type	Remarks
MT5382	C22	ALIN	INT_CEC	GPIO46	Input	Interrupt Port from Stby Controller
MT5382	A23	AOBCK	Reserved	GPIO49	N/A	Trap(0)
MT5382	B23	AOLRCK	Reserved	GPIO48	N/A	Trap(1)
MT5382	A24	AOMCLK	INTERRUPT	GPIO47	Input	Interrupt Port for BDS Bolt-On
MT5382	D22	AOSDATA0	ANA-DIG_DIM_SELECT	GPIO50	Output	Analog or Digital Dimming Selection
MT5382	C23	AOSDATA1	LCD_PWR_ON	GPIO51	Output	Vdisp On/Off Control Signal
MT5382	B24	AOSDATA2	+12VDISP_DETECT	GPIO52	Input	Display Power Detection
MT5382	A25	AOSDATA3	HEADPHONE_DETECT	GPIO53	Input	Headphone Detection Indicator
MT5382	B25	AOSDATA4	FLASH_WE	GPIO54	Output	Serial Flash Write Enable
MT5382	Y5	GPIO6	USB_PWE	GPIO6	Output	USB Power Enable
MT5382	AA4	GPIO7	USB_OC	GPIO7	Input	USB Over Current
MT5382	C19	GPIO8	PRST	GPIO8	Output	MT8280 Power On Reset
MT5382	A20	GPIO9	CHDEC_RESET	GPIO9	Output	Reset Signal for MT5112
MT5382	B19	GPIO10	PWN	GPIO10	Output	MT8280 Power Down Mode
MT5382	B18	GPIO11	INT0	GPIO11	Input	Interrupt from MT8280
MT5382	A18	GPIO12	8280_DETECT	GPIO12	Input	MT8280 Detection
MT5382	B17	GPIO13	ANA-DIG_AUD_SELECT	GPIO13	Output	Gain Selection to Pre-Amp (Reserved)
MT5382	AE1	OWRP2	EDID_WE	GPIO39	Output	WE for EDID EEPROMs
MT5382	U23	VCXO	UART_SELECT	GPIO67	Output	Service UART Selector (Reserved)
MT5382	C11	PAALE	HDMI_HPD_2	GPIO23	Output	HDMI Hotplug Detect for HDMI2
MT5382	D11	PACLE	DDC_RESET	GPIO24	Output	DDC Line Reset Signal
MT5382	E11	PARB	BACKLIGHT_ON_OFF	GPIO21	Output	LCD Backlight On/Off Control
MT5382	B9	PDD2	CTRL_DISP1_uP	GPIO25	Output	Display Control (Reserved)
MT5382	E10	PDD3	CTRL_DISP4_uP	GPIO26	Output	Display Control (Reserved)
MT5382	D10	PDD4	HDMI_HPD_3	GPIO27	Output	HDMI Hotplug Detect for HDMI3
MT5382	C10	PDD5	RESET_PI	GPIO28	Output	Reset Signal for ProIdiom
MT5382	B10	PDD6	HDMI_RESET	GPIO29	Output	Reset Signal for Sil9185
MT5382	A10	PDD7	SYS_EEPROM_WE	GPIO30	Output	WE for System EEPROM
MT5382	E9	POWE	HDMI_HPD_1	GPIO22	Output	HDMI Hotplug Detect for HDMI1
MT5382	D25	PWM0	Reserved	GPIO40	N/A	Trap(0)
MT5382	E20	PWM1	PWM_DIMMING	GPIO41	Output	PWM for Backlight Dimming / Trap(0)
MT5382	D20	PWM2	BACKLIGHT_BOOST	GPIO42	Output	LCD Backlight Boosting / Trap(0)
MT5382	AB14	OPCTRL0	CEC	GPIO200	N/A	HDMI CEC Line
MT5382	AC14	OPCTRL1	POWER_DOWN	GPIO201	Input	Power-down Indicator
MT5382	AD7	OPCTRL2	SDM	GPIO202	Input	SDM Mode Detection (Startup Only)
MT5382	AC7	OPCTRL3	MUTEn	GPIO203	Output	Audio Output Muting
MT5382	AD14	OPCTRL4	ANTI_PLOP	GPIO204	Output	Audio Anti-Plop Control / Trap(1)
MT5382	AC13	OPCTRL5	DC_PROT	GPIO205	Input	Audio Output DC Protection / Trap(1)
MT5382	E19	ORIO	HDMI_HPD_Side	GPIO43	Output	HDMI Hotplug Detect for HDMI Side
WT61P7	pin 9	GPIOB2	IR	Pin 9	Input	From IR Receiver
WT61P7	pin 10	GPIOB1	CEC	Pin 10	N/A	HDMI CEC Line
WT61P7	pin 19	GPIOC0	KEYBOARD	Pin 19	Input	Key Control (Ladder Circuit) Input
WT61P7	pin 20	DSDA1	SDA	Pin 20	N/A	Data Line to SDA Bus
WT61P7	pin 21	DSCL1	SCL	Pin 21	N/A	Clock Line to SCL Bus
WT61P7	pin 24	GPIOA3	LED1	Pin 24	Output	Main LED (White) Control
WT61P7	pin 25	GPIOA2	LED2	Pin 25	Output	Standby LED (Red) Control
WT61P7	pin 26	GPIOA1	INT_CEC	Pin 26	Output	Interrupt Output to MT5382
WT61P7	pin 35	GPIOD0	POWER_DOWN	Pin 35	Input	+12V Detection
WT61P7	pin 41	GPIOE2	STANDBYn	Pin 41	Output	Power Control Line (Inverted)

This section details the control signal descriptions. The control signals are classified by their respective functions as follows:

- System
- Audio
- Display
- HDMI
- USB.

9.9.1 System Control Signals

8280_DETECT

The 8280_DETECT signal is used to inform the MT5382 of the presence of MT8280.

FLASH_WE

The FLASH_WE signal is the write enable signal for the system flash IC. This signal is hardware-wise write enabled by default but is put to disabled after it is written with a valid software image file.

IR

The IR signal is an output from the remote control IR receiver. This signal is connected in parallel to both MT5382 and Standby Controller.

KEYBOARD

The KEYBOARD signal is a DC signal from the control board ladder circuit indicating which key has been pressed.

LED1

The LED1 control signal comes from the Standby Controller and its function is to control the ON mode LED. The ON mode LED is "White" in color and represents the status of the system, where it is “on” only in normal operation. A low signal turns on the LED, while a high signal turns off the LED.

LED2
The LED2 control signal controls the secondary LED, and is controlled by the Standby Controller. Similar, a low signal turns on the LED, while a high signal turns off the LED. The LED blinks in protection mode.

LIGHT_SENSOR
The LIGHT_SENSOR signal is an ADC input from the ambient light sensor. The converted digital value is used in video and picture quality improvement algorithms; refer to Video/PQ HSI for the details.

FLASH_MJC_WE
The MJC_FLASH_WE signal is the write enable signal for the MT8280 flash IC. This signal is hardware wise by default write enabled but is put to disabled after it is written with a valid software image file.

PANEL
The PANEL signal is used for service and is detected only at startup. When activated, the system will go into PANEL mode.

PWRDET
The PWRDET signal detects the power status of the +3V3 supply at startup. The usage of this signal is described in chapter 5 “Service Modes, Error Codes, and Fault Finding”.

POWER_DOWN
The POWER_DOWN signal is an input from the power-down detection circuit. For the Standby Controller, this signal is used to detect the presence of +12V during the startup process.

SCL + SDA
I^2C signals.

SDM
The SDM signal is used for service and is detected only at startup. When activated, the system will go into SDM mode.

STANDBYn
The STANDBYn signal is used to control the system power status, which is used to put the power supply unit to standby or normal operation. This signal is controlled by the Standby Controller.

SYS_EEPROM_WE
The SYS_EEPROM_WE signal is the write enable signal for the system EEPROM IC. The signal is connected to the active low Write Control pin of the EEPROM via a transistor inverter. This signal is only active when the system is conducting a write operation to the system EEPROM.

+12VDISP_DETECT (RESERVED)
The +12VDISP_DETECT signal is an input from the display timing controller power detection circuit. This signal is used to detect any power faults on the mentioned power line.

9.9.2 Audio Control Signals

ANTI_PLOP
The ANTI_PLOP signal is used as an as anti-plop control for the audio muting circuit.

DC_PROT
The DC_PROT signal is used to detect DC voltage level fault condition at the speaker output to send the system into protection in order to protect the audio amplifier and speakers.

HEADPHONE_DETECT
The HEADPHONE_DETECT signal is used to detect the presence of a headphone connection to the Side AV headphone socket. When a headphone connection is detected, the speaker output should be muted.

MUTEn
The MUTEn signal is used as the mute control to the TDA8932BT class-D audio amplifier in an open drain application.

ANA-DIG_AUDIO_SELECT (RESERVED)
The ANA-DIG_AUDIO_SELECT signal is used as a gain selector for audio pre-amplifier. The purpose is to halve the gain in the case of digital inputs, which includes HDMI and digital TV inputs. The usage of this control signal is reserved, so it should be set as high impedance during normal operation.

9.9.3 Display Control Signals

ANA-DIG_DIM_SELECT (RESERVED)
The ANA-DIG_DIM_SELECT control signal is used to select between digital PWM or analog DC backlight dimming method based on the display type (display option), by acting as a control signal to a 2:1 analog switch. By default, only digital PWM backlight dimming will be used. The analog DC backlight dimming is a provision for future displays which employs the latter methodology.

BACKLIGHT_BOOST
The BACKLIGHT_BOOST signal is a PWM output to the backlight boost circuit for display control.

BACKLIGHT_ON_OFF
The BACKLIGHT_ON_OFF signal is used to turn the display backlight on and off.

CTRL_DISP1_uP
The CTRL_DISP1_uP signal is reserved for use with SDI PDP display control. When other displays are used, this port should be tri-stated.

CTRL_DISP4_uP
The CTRL_DISP4_uP signal is reserved for use with FHP PDP display control. When other displays are used, this port should be tri-stated.

LCD_PWR_ON
The LCD_PWR_ON signal is used to turn the supply to the display timing controller board on and off.

PWM_DIMMING
The PWM_DIMMING signal is a PWM output to the backlight dimming circuit for display control.

9.9.4 HDMI Control Signals

HDMI_RESET
The HDMI_RESET signal is used to reset the Sil9185 HDMI switch.

CEC
The CEC control signal is used as the system CEC control line. CEC is an AV systems control protocol derived from P50 adapted for HDMI control. This signal is connected to both MT5382 and the Standby Controller, with the latter handling the standby mode wake-up commands and the former handling all normal operation commands.

DDC_RESET
The DDC_RESET signal is used for HDMI DDC data reset purpose during HDMI signal detection.

EDID_WE
The EDID_WE signal is the WE signal for the HDMI EEPROM ICs. The signal is connected to the active low Write Control pin of the EEPROM via a transistor inverter. This signal is only used for the programming of EDID EEPROMs via MT5382. It is not used during normal operation mode.

HDMI_HPD_1
The HDMI_HPD_1 signal is used for resetting the HDMI source connected to HDMI1 during the hot plug process.

HDMI_HPD_2
The HDMI_HPD_2 signal is used for resetting the HDMI source connected to HDMI2 during the hot plug process.

HDMI_HPD_3
The HDMI_HPD_3 signal is used for resetting the HDMI source connected to HDMI3 during the hot plug process.

HDMI_HPD_SIDE
The HDMI_HPD_Side signal is used for resetting the HDMI source connected to Side HDMI during the hot plug process.

INT_CEC
The INT_CEC signal is the interrupt signal from WT61P7 to MT5382 for event notification. On the MT5382, an interrupt port is used to receive the notification.

9.9.5 USB Control Signals

USB_OC
The USB_OC signal is an over-current indicator from the USB power switch.

USB_PWE
The USB_PWE signal is the enable signal for the USB power switch.

9.9.6 MT8280 Control Signals

PRST
The PRST signal is the reset signal for MT8280.

PWN
The PWN signal is used to put the MT8280 into power down mode.

INT0
The INTERRUPT signal is reserved for interrupt signals from BDS bolt-on modules. For operational details, refer to BDS specifications.

9.10 Abbreviation List

1080i	1080 visible lines, interlaced
1080p	1080 visible lines, progressive scan
2CS	2 Carrier Sound
2DNR	Spatial (2D) Noise Reduction
3DNR	Temporal (3D) Noise Reduction
480i	480 visible lines, interlaced
480p	480 visible lines, progressive scan
AARA	Automatic Aspect Ratio Adaptation: algorithm that adapts aspect ratio to remove horizontal black bars; keeping up the original aspect ratio
AC	Alternating Current
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	analogue to Digital Converter
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic Gain Control: algorithm that controls the video input of the feature box
AM	Amplitude Modulation
AUO	Acer Unipack Optronics
AP	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASD	Automatic Standard Detection
AV	Audio Video
BDS	Broadcasting Data Services (used for EPG)
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television System Committee
CAM	Conditional Access Module
CBA	Circuit Board Assembly (or PWB)
CEC	Consumer Electronics Control bus; remote control bus on HDMI connections
CI	Common Interface; E.g PCMCIA slot for a CAM in a set top box
CL	Constant Level: audio output to connect with an external amplifier
CLUT	Color Look Up Table
ComPair	Computer aided rePair
COFDM	Coded Orthogonal Frequency Division Multiplexing; A multiplexing technique that distributes the data to be transmitted over many carriers
CSM	Customer Service Mode
CVBS	Composite Video Blanking and Synchronization
CVBS-MON	CVBS monitor signal
CVBS-TER-OUT	CVBS terrestrial out
CVI	Component Video Input
DAC	Digital to analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DC	Direct Current
DDC	Display Data Channel; is a part of the "Plug and Play" feature
DFU	Directions For Use: owner's manual
DNR	Dynamic Noise Reduction
DRAM	Dynamic RAM
DSP	Digital Signal Processing
DST	Dealer Service Tool: special (European) remote control designed for service technicians
DTS	Digital Theatre Sound
DVB(T)	Digital Video Broadcast; An MPEG2 based standard for transmitting digital audio and video. T= Terrestrial
DVD	Digital Versatile Disc
DVI	Digital Visual Interface
DW	Double Window
ED	Enhanced Definition: 480p, 576p
EDID	Extended Display Identification Data (VESA standard)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EU	EUrope
EXT	EXTernal (source), entering the set by SCART or by cinches (jacks)
FBL	Fast Blanking: DC signal accompanying RGB signals
FBL-TXT	Fast Blanking Teletext
FLASH	FLASH memory
FM	Field Memory / Frequency Modulation
FMR	FM Radio
FPGA	Field-Programmable Gate Array
FRC	Frame Rate Converter
FTV	Flat TeleVision
H	H_sync to the module
HD	High Definition: 720p, 1080i, 1080p
HDCP	High-bandwidth Digital Content Protection; A "key" encoded into the HDMI/DVI signal that prevents video data piracy. If a source is HDCP coded and connected via HDMI/DVI without the proper HDCP decoding, the picture is put into a "snow vision" mode or changed to a low resolution. For normal content distribution, the source and the display device must be enabled for HDCP "software key" decoding
HDMI	High Definition Multimedia Interface, digital audio and video interface
HP	Head Phone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
I2S	Integrated IC Sound bus
IBO(Z)	Intelligent Bolt On module. Z= Zapper; module for DVB reception.
IC	Integrated Circuit
IF	Intermediate Frequency
IPB	Integrated Power Board (PSU with integrated inverters to drive the LCD backlight)
IR	Infra Red
IRQ	Interrupt ReQuest
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at start-up of the set to configure it according the customers wishes
LATAM	LATin AMerica
LC07	Philips chassis name for LCD TV 2007 project
LCD	Liquid Crystal Display
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LPL	LG Philips LCD
LS	Loud Speaker
LVDS	Low Voltage Differential Signalling, data transmission system for high speed and low EMI communication.
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MOSFET	Metal Oxide Semiconductor Field Effect Transistor

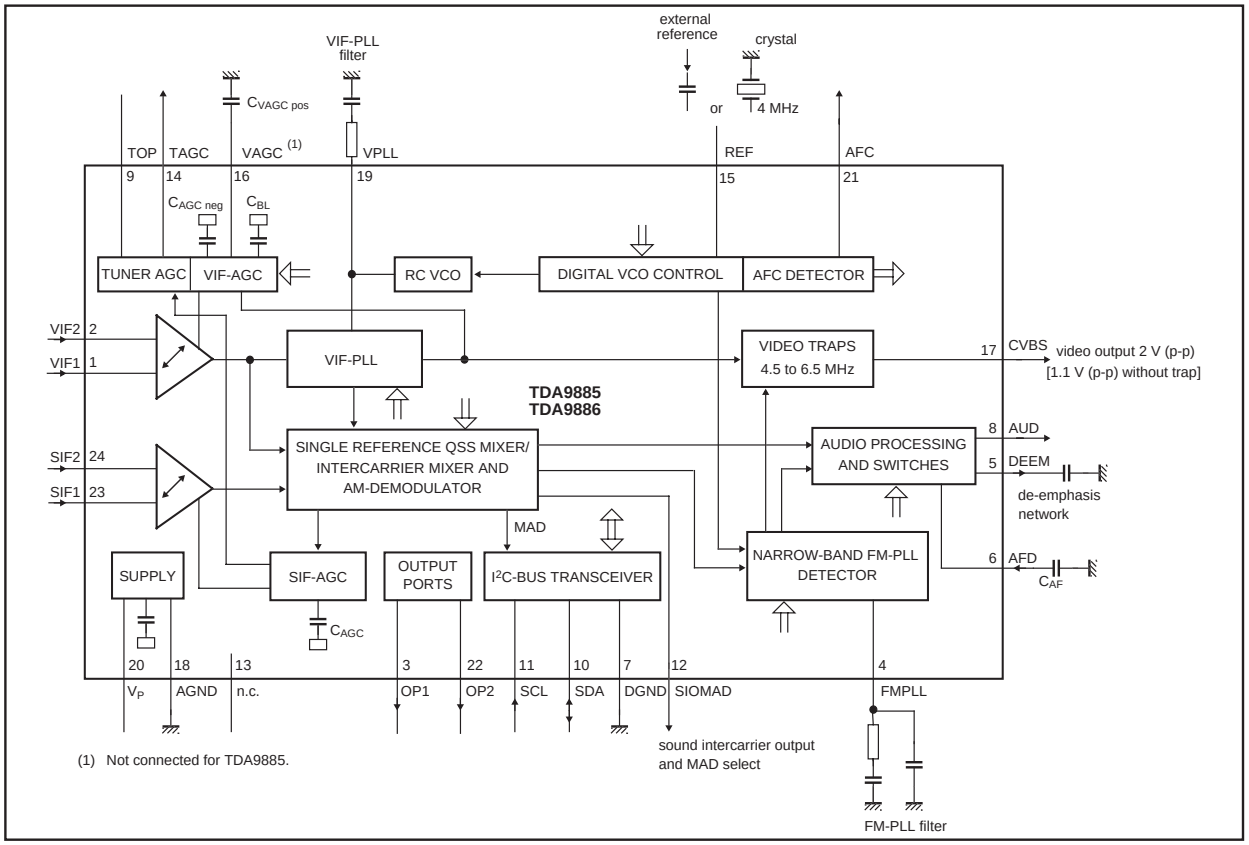
MPEG	Motion Pictures Experts Group
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	MUTE Line
NAFTA	North American Free Trade Association: Trade agreement between Canada, USA and Mexico
NC	Not Connected
NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, used mainly in Europe.
NTSC	National Television Standard Committee. Color system used mainly in North America and Japan. Color carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing TV related data (for example, options)
O/C	Open Circuit
ON/OFF LED	On/Off control signal for the LED
OAD	Over the Air Download
OSD	On Screen Display
PAL	Phase Alternating Line. Color system used mainly in Western Europe (color carrier = 4.433619 MHz) and South America (color carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)
PC	Personal Computer
PCB	Printed Circuit Board (or PWB)
PDP	Plasma Display Panel
PIG	Picture In Graphic
PIP	Picture In Picture
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can directly provide the desired frequency
PSU	Power Supply Unit
PWB	Printed Wiring Board (or PCB)
RAM	Random Access Memory
RC	Remote Control transmitter
RC5 (6)	Remote Control system 5 (6), the signal from the remote control receiver
RF	Radio Frequency
RGB	Red, Green, and Blue. The primary color signals for TV. By mixing levels of R, G, and B, all colors (Y/C) are reproduced.
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync
ROM	Read Only Memory
SAM	Service Alignment Mode
SC	SandCastle: two-level pulse derived from sync signals
SC1-OUT	SCART output of the MSP audio IC
SC2-OUT	SCART output of the MSP audio IC
S/C	Short Circuit
SCL	Clock signal on I2C bus
SD	Standard Definition: 480i, 576i
SDA	Data signal on I2C bus
SDI	Samsung Display Industry
SDM	Service Default Mode
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Memoire. Color system used mainly in France and Eastern Europe. Color carriers = 4.406250 MHz and 4.250000 MHz
SIF	Sound Intermediate Frequency
SMPS	Switch Mode Power Supply
SND	SouND
SOPS	Self Oscillating Power Supply
S/PDIF	Sony Philips Digital InterFace
SRAM	Static RAM
SSB	Small Signal Board
STBY	Stand-by
SVHS	Super Video Home System
SW	Sub Woofer / SoftWare / Switch
THD	Total Harmonic Distortion
TXT	TeleteXT
uP	Microprocessor
VL	Variable Level out: processed audio output toward external amplifier
VCR	Video Cassette Recorder
VGA	Video Graphics Array
WD	Watch Dog
WYSIWYR	What You See Is What You Record: record selection that follows main picture and sound
XTAL	Quartz crystal
YPbPr	Component video (Y= Luminance, Pb/Pr= Color difference signals B-Y and R-Y, other amplitudes w.r.t. to YUV)
Y/C	Video related signals: Y consists of luminance signal, blanking level and sync; C consists of color signal.
Y-OUT	Luminance-signal
YUV	Baseband component video (Y= Luminance, U/V= Color difference signals)

9.11 IC Data Sheets

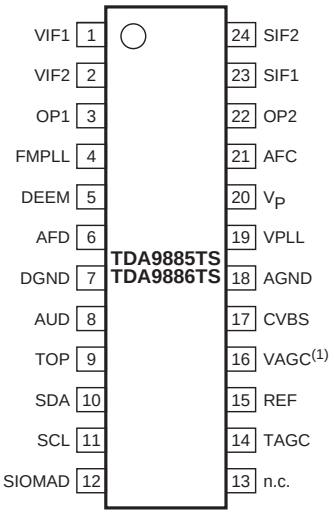
This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs).

9.11.1 Diagram B2, Type TDA9886T (IC7201), Demodulator

Block Diagram



Pin Configuration

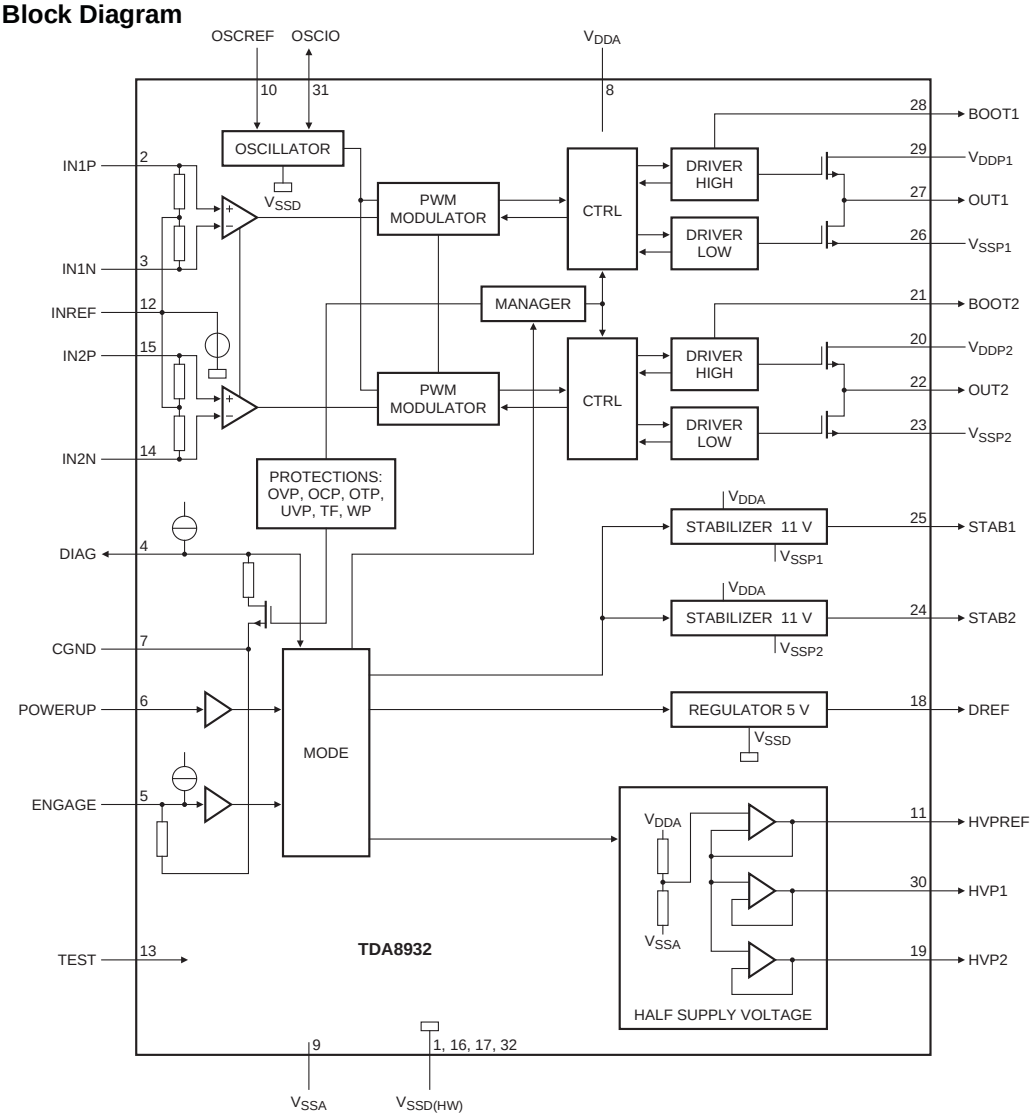


G_16510_059.eps
221106

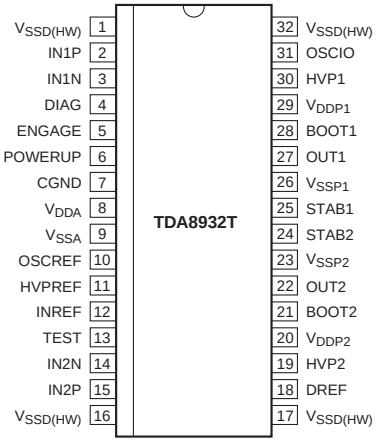
Figure 9-12 Internal block diagram and pin configuration

9.11.2 Diagram B3, Type TDA8932BT (IC7301), Class-D Audio Amplifier

Block Diagram



Pin Configuration

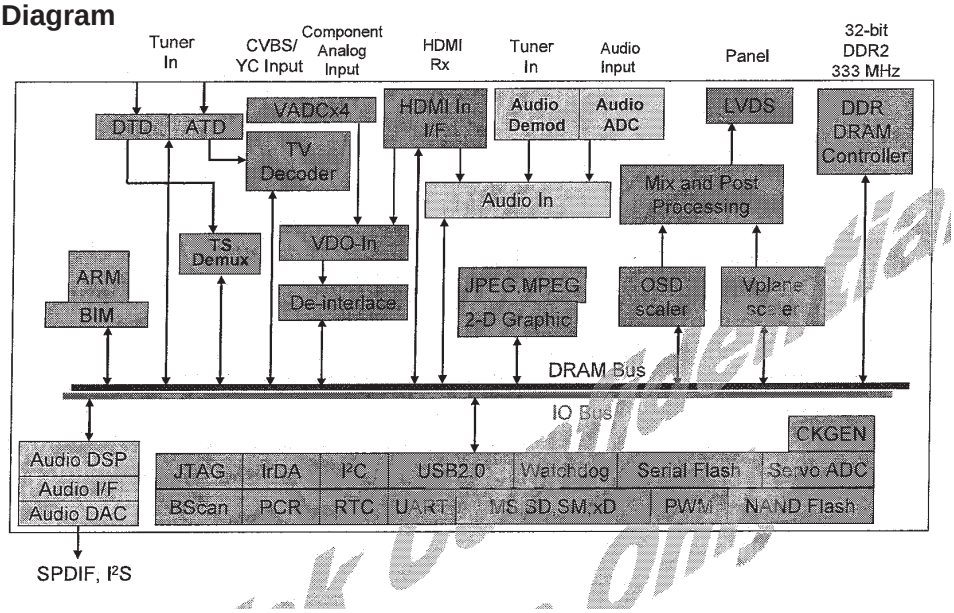


G_16860_045.eps
300107

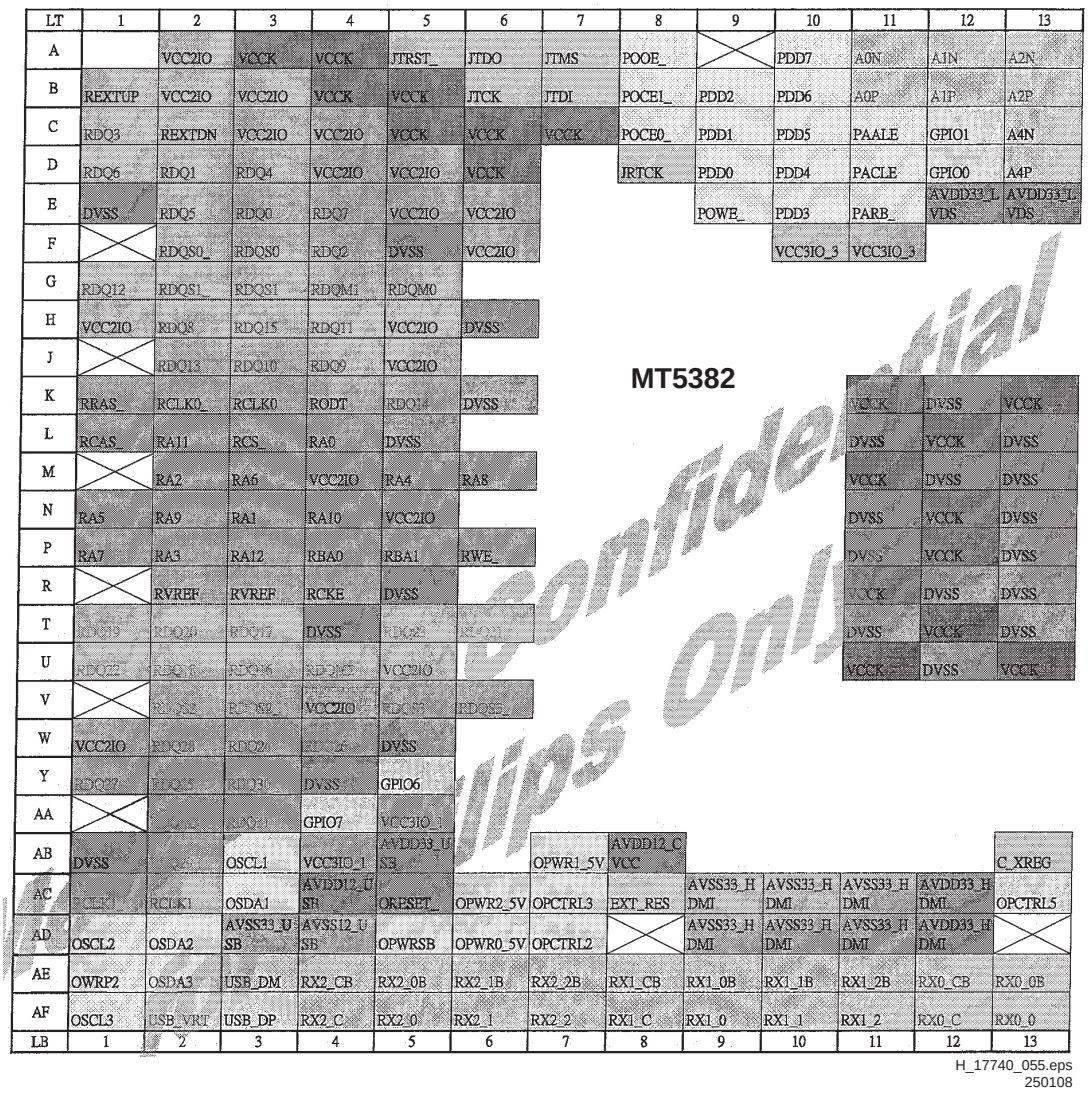
Figure 9-13 Internal block diagram and pin configuration

9.11.3 Diagram B4, Type MT5382 (IC7A01), Audio / Video Processor

Block Diagram



Pin Configuration



H_17740_055.eps
250108

Figure 9-14 Internal block diagram and pin configuration

9.11.4 Diagram B4E Type SIL9185 (IC7E18), HDMI Multiplexer

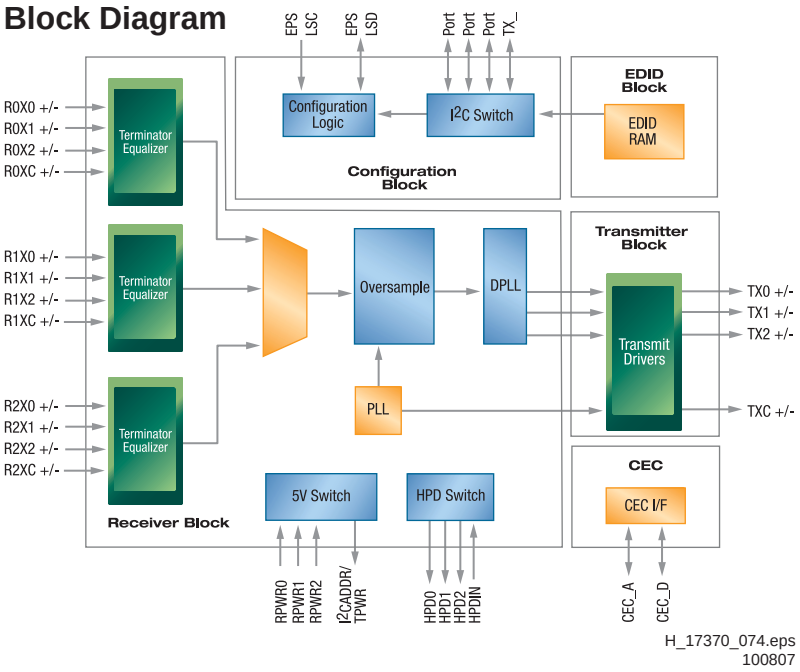


Figure 9-15 Internal block diagram

10. Spare Parts List

For the latest spare part overview, please consult the Philips Service website.

11. Revision List

Manual xxxx xxx xxxx.0

- First release.

Manual xxxx xxx xxxx.1

- **All chapters:** Added 32PFL3403D/85, 32PFL5403D/27, 32PFL5413D/85, 42MF438B/27, 42PFL3403D/27, 42PFL3603D/27, 42PFL5403D/85, 42TA648BX/37, 47PFL3603D/27, 47TA648BX/37, 52MF438B/27, 52PFL3603D/27, 52PFL5603D/27
- **All chapters:** Some textual improvements.
- **Chapter 1:** Improved connection overview drawing.
- **Chapter 4:** Highlighted the importance of the cable tapes.
- **Chapter 5:** Info added on how to copy NVM data to and from USB stick.
- **Chapter 7:** Diagrams B7L and B7M indicated as “Reserved”.
- **Chapter 8:** Tint settings table and Option code overview updated.